CounterAttack
TRAFFIC RESEARCH PAPERS

1986

Province of British Columbia
Ministry of Attorney General

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DRINKING DRIVING
COUNTERATTACK

A joint program of the Ministry of Attorney General and
the Insurance Corporation of British Columbia.

CounterAttack
TRAFFIC RESEARCH PAPERS

1986

TRAFFIC CONVICTIONS AND TRAFFIC ACCIDENTS

TRAFFIC ACCIDENT TYPES

CAUSES OF FATAL TRAFFIC ACCIDENTS

TRAFFIC ACCIDENT EPIDEMIOLOGY

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February, 1987

British Columbia Cataloguing in Publication Data

Main entry under title:
CounterAttack traffic research papers. -- 1984-

Annual.
Papers written by G. William Mercer.
Continues: Alcohol-related casualty traffic accidents in British Columbia.
ISSN 0830-0313 = CounterAttack traffic research papers

1. Drinking and traffic accidents - British Columbia. 2. Traffic accidents - British Columbia. I. Mercer, G. William. II. CounterAttack (B.C.) III. Title: Traffic research papers.

HE5614.5.C2C68 363.1'251'09711

A Message from the Attorney General

May, 1987, marks the 10th anniversary of British Columbia's drinking-driving CounterAttack program.

As Attorney General and Minister responsible for the program, I am pleased to announce that the combination of enforcement and public education CounterAttack has coordinated over the past 10 years has significantly changed the behavior of many B.C. drivers.

Not only is drinking-driving lowest at Christmas, but the annual police roadcheck campaigns and year-round public education have reduced drinking-driving traffic accidents in B.C. by about 50 per cent since the program began in 1977.

That means over 8,000 persons saved from injury or death - as many people as the entire population of towns such as Williams Lake, Chilliwack, Castlegar, Trail, or Squamish.

Research has proven that visible enforcement is a powerful tool in crime prevention. If people perceive a strong and immediate police presence, they are less likely to commit a crime.

The CounterAttack Program uses this principle in helping police with their drinking-driving "blitzes" by supplying 14 mobile breath-testing vans - called "BATmobiles" - by producing media materials to help publicize the blitzes, and by helping to coordinate and evaluate them.

Due to CounterAttack, drinking-driving accidents now are lowest during Christmas and New Year's.

As a direct result of these blitzes, the level of drinking-driving accidents is at its lowest during the Christmas and New Year's period.

For the last three years, the program has also been coordinating local spring

roadcheck campaigns because it has been identified as one of the highest periods of the year for alcohol-related traffic accidents.

Enforcement goes on throughout the year, of course, and the police and courts have done a very good job. Since CounterAttack began, over 200,000 drinking-driving charges have been laid - and the conviction rate has been about 90 per cent.

Public education is a major part of CounterAttack's year-round activity. We are all familiar with CounterAttack's TV and radio messages that are produced and broadcast throughout the year.

Brochures and posters parallel these messages and are distributed throughout the province to schools, libraries, police, liquor stores, and a wide range of special-interest groups such as the B.C. Medical Association, B.C. Automobile Association, Mothers Against Drunk Driving, and the general public.

The program also supplies all schools in the province with drinking-driving educational materials such as lesson plans, slide presentations, films, videos, etc.

And public participation is encouraged through community-based Counter-Attack groups, which are brought together at local and province-wide conferences for both adults and students.

Of those children who are 10 years old today, one in 20 will be killed or injured in drinking-driving accidents within the next decade.

But it is not enough. Despite the success of these activities over the past 10 years, there is still much to do. Drinking-driving is still the most common cause of fatal accidents, especially those involving young drivers.

If the current rate of drinking-driving continues, about five of every 100 of those who are 10 years old today will be killed or injured in alcohol-related traffic accidents within the next decade.

But it needn't happen. B.C. Drivers and their friends and families can join together to help stop drinking-driving accidents.

CounterAttack is more than just a roadcheck. It is everybody in the province working together to make the next decade even safer than the last.

As Attorney General - and as a fellow British Columbian and driver - I urge you to join me in this life-saving endeavor.

The Honourable
Brian R. D. Smith, Q.C.
Attorney General

DRINKING DRIVING
COUNTERATTACK

NOTE

The views expressed in this publication are entirely those of the writer and do not necessarily represent the views or policies of the Ministry of Attorney General or the Province of British Columbia.

OTHER COUNTERATTACK PUBLICATIONS

CounterAttack Traffic Research Papers, 1985, Ministry of Attorney General, British Columbia, 1986

This is a collection of eleven research papers on traffic-related issues completed by the CounterAttack Program during 1985. Topics covered include: influences on traffic accident frequency and severity; the media and police enforcement campaigns; drivers' characteristics and accident types; and causes and locations of traffic accidents. 190 pp. (See also Appendix C herein)

CounterAttack Traffic Research Papers, 1984, Ministry of Attorney General, British Columbia, 1985

This is a collection of eighteen research papers on traffic-related issues completed by the CounterAttack Program during 1984. Topics covered include: the CounterAttack Program history and evaluation; a discussion of the measurement of "alcohol involvement"; public opinion and knowledge of drinking-driving; the relationship between drivers's age and the causes of traffic accidents; the characteristics of victims of traffic accidents such as age, gender, and position in vehicle; the locations and causes of traffic accidents; the success of roadcheck enforcement "blitzes"; and epidemiological studies of restraint device use and vehicle occupant age. 207 pp.

Alcohol-Related Casualty Traffic Accidents in British Columbia, Ministry of Attorney General, British Columbia, 1984.

This document is a collection of studies which examined the characteristics of alcohol-related casualty traffic accidents in terms of their costs, causes, trends, locations, circumstances, and driver age and experience. 116 pp.

Driving While Impaired: Drivers, Charges and Outcomes, Ministry of Attorney General, British Columbia, 1983.

This study examined the court and driving records of 1,531 drivers charged with Driving While Impaired under the Canadian Criminal Code. These drivers were examined in terms of their demographic characteristics, past driving histories, method of apprehension, Blood Alcohol Content (BAC) at the time of arrest, and the outcome of their court appearances. In addition, their demographic and BAC characteristics were compared to those of a representative sample of drivers in British Columbia in order to assess any differences between those persons driving while impaired and those apprehended for same. 49 pp.

The Characteristics of Night-Time Drivers in British Columbia, Ministry of Attorney General, British Columbia, 1982.

This study examined the demographic characteristics, seat belt use and Blood Alcohol Content (BAC) of a representative sample of night-time drivers in B.C. 54 pp.

These publications are available by writing:

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ACKNOWLEGEMENTS

The writer wishes to thank the following people without whom this research would not exist: Mr. Ron Boyle, Director of Policing Programs, Ministry of Attorney General and Mr. Hugh Lindsay, Manager, Traffic Safety Education, Insurance Corporation of British Columbia, who allocated the resources for the work; Mr. John Phillips, Director, Administration and Safety and Ms. Janice Schmidt, Research Officer, of the Motor Vehicle Department of the Ministry of Transportation and Highways, who supplied the raw traffic accident data; Mr. Tim Devlin of Simon Fraser University and Ms. S. Snook, Systems Analyst who assisted with the computer analyses; and Ms. Joanne Kokubo, Police Services Branch, Ministry of Attorney General who assisted with the research, placed the text on a word processor, and managed its presentation format.

G. William Mercer, PhD.
Director of Research
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Ministry of Attorney General

February, 1987

FOREWORD

This document is a collection of selected papers produced by the CounterAttack Program, most of which have been previously distributed on a limited basis. They have been selected for inclusion not only because they represent the sort of work done by CounterAttack research, but also because they address topics which have been of general interest not only to traffic safety researchers, but also to the police, policy makers, and the public. While each paper is complete unto itself, they have been organized into the following broad categories:

TRAFFIC CONVICTIONS AND TRAFFIC ACCIDENTS

TRAFFIC ACCIDENT TYPES

CAUSES OF FATAL TRAFFIC ACCIDENTS

TRAFFIC ACCIDENT EPIDEMIOLOGY

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EXECUTIVE SUMMARY

TRAFFIC CONVICTIONS AND TRAFFIC ACCIDENTS

Frequency, Types and Patterns of Traffic Convictions and Frequency and Type of Traffic Accidents

These analyses show that a relatively high traffic violation conviction count and relatively frequent and severe traffic accidents are associated with the demographic characteristics of being male and under 30 years of age, and that a relatively small proportion of the drivers (5%) are having a relatively large proportion of the reported accidents (44%).

A factor analytic examination of the pattern and frequency of nine common traffic violations revealed two separate but closely related factors: a "reckless driving" factor marked by speeding, disobeying stop sign, disobeying signs or signals, disobeying red light and speeding in a school zone convictions; and a "drinking-driving" factor marked by 24 hour drinking-driving licence suspension, drinking-driving criminal convictions, excess speed for conditions and speeding convictions. High scores on these factors related to the driver being male and under 30 years of age, to having had relatively frequent traffic accidents and to having had relatively severe traffic accidents. Further, both factors were positively related to traffic accident frequency when the effects of driver age were removed.

The emergence of a reckless driving violation pattern and a drinking-driving violation pattern and their strong relationship to both traffic accident frequency and severity leads to a number of conclusions: First, in addition to following closely in traffic (Evans and Wasielewski, 1982), the driving behaviours loading on the factors can be argued to represent a high-risk driving style that involves speeding, ignoring traffic signs and signals (e.g. red lights, stop signs) and drinking driving.

Second, the existence of a reckless driving factor that is distinct from the drinking driving factor and that is equally predictive of accident involvement allows a wider base of violations to be used to identify high-risk drivers. Thus, not only convicted drinking drivers, but any driver with a violation pattern that resulted in a high score on either the reckless driving or drinking-driving factor could be considered as a high-risk driver. Legislation could thus be considered that would require these drivers to take remedial driver training, and that training ought to relate to all aspects of traffic safety as opposed to focussing on alcohol-related topics.

Finally, the close relationship between the reckless driving factor and the drinking-driving factor argues for the existence of an overall high-risk driving style that includes but is not limited to drinking driving.

Traffic Accident Frequency, Traffic Convictions, Driver Age and Driver Gender. British Columbia, June 1980 - December 1984.

The results of these analyses suggest that a relatively small proportion of the drivers (5%) are having a relatively large proportion of the traffic accidents (44%), and that these drivers tend to be young males. In terms of traffic-related convictions, those with frequent accidents have a record of frequent convictions, especially convictions having to do with speeding and intersection behaviours (e.g. red light, yellow light, stop sign). In addition, they are more likely to not wear seat belts, to not be able to produce a valid driver's licence, and to be driving uninsured.

TRAFFIC ACCIDENT TYPES

Fatality-Producing vs. Injury-Only Traffic Accidents: Trends, Characteristics, Persons Involved, and Consequences. British Columbia, 1985

To summarize, the proportion of fatality-producing to injury-only casualty traffic accidents has gradually declined over the past 10 years to a 1985-86 level of 1.7%, with the highest seasonal proportion occurring during the summer months. While the charge history of drivers in injury-only accidents is similar to that of drivers in fatal accidents (Mercer, 1986), accident characteristics and other driver characteristics differ between the typical fatal and typical injury-only traffic accident.

From these analyses the typical fatal accident in B.C. in 1985 occurred on a rural, high-speed road in the dark on a weekend. It most likely involved a single vehicle that either failed to negotiate a curve, or simply ran off the side of a straight road while if a second vehicle was involved there was often a head-on collision. The most frequent contributing factors to the accident were excessive speed and/or alcohol.

Drivers in fatal accidents were most frequently male (80%). About 45% of the male drivers 34 years of age or older carried passengers, and the passengers were slightly more likely to be male than female, while half of the younger male drivers carried passengers and the passengers were much more likely to be male than female. On the other hand, about 56% of both younger and older female drivers in fatal accidents carried passengers, and the passengers were much more likely to be female than male. Further, occupants of vehicles driven by males were less likely to wear restraint devices than were occupants in vehicles driven by females. Finally, the average age of male victims in fatal accidents was 33 years and female victims was 39 years.

In contrast, a typical injury-only accident occurred on an urban, 50 kph road in the daylight during the evening "rush hours". It most likely involved one vehicle which rear-ended or struck another vehicle at 90° at an intersection. The most frequent contributing factors were driving without due care and/or failure to yield the right of way.

There was a higher proportion of female drivers in injury-only accidents than in fatal accidents, although the majority of drivers in injury-only accidents (70%) were male. Overall, drivers in injury-only accidents were less likely to carry passengers than were drivers in fatal accidents. A third of the male drivers 34 years of age or older carried passengers and the passengers were slightly more likely to male than female, while 39% of the younger male drivers carried passengers and the passengers were appreciably more likely to be male. On the other hand, while fewer of the older female drivers carried passengers than did the younger female drivers, in all cases the passengers were more likely to be female than male. Restraint device use rates were similar for occupants of vehicles driven by males as for vehicles driven by females. Finally, the average victim age for both males and females in these injury-only accidents was less than for victims of fatal accidents, with an average male victim age of 30 years and an average female victim age of 33 years.

Admittedly, every traffic accident is unique, and within both the fatal and injury-only categories there are a number of subsets that have not been addressed (e.g. pedestrian, commercial vehicle, motorcycle). However, in order to design counter-measures and identify target groups, accident types need to be characterized. Indeed, the young male drinking driver in a high-speed, night-time, single-vehicle crash is a well-recognized central figure in fatal accidents. However, when injury-only casualty accidents are contrasted with fatal accidents, other important and exponentially more common accident configurations emerge. For example, the female driver becomes a very significant factor, accounting for almost a third of the drivers in injury-only accidents, while the older male driver with no passengers going through intersections during "rush hours" also gains in importance. Also of central importance in injury-only accidents are the contributing factors of carelessness and failure to yield, and the daytime and during the week as accident times.

It follows that to further reduce traffic accident frequencies, educators and policy-makers might expand public education programs and police enforcement priorities to more comprehensively address the full range of target groups and casualty accident types.

Intersection Casualty Accidents: Trends, Characteristics, Persons Involved, and Consequences. British Columbia, 1985

To summarize, 42% to 46% of all casualty accidents in B.C. occurred where one road crossed another, with the highest number and lowest proportion occurring during the summer months. They

happened most frequently in business and shopping areas, especially during the evening "rush hours". They tended to occur in daylight or in good artificial lighting and primarily in good weather, although about a third occurred in wet conditions.

Turning to the traffic control devices at the accident scene, a third of the casualty intersection accidents occurred where there were no traffic signs or signals, a third where there were stop signs, and a third where there were stop lights. Of the latter, 45% occurred on a red light, 45% on a green light, and 10% on an amber light. It is noteworthy that, contrary perhaps to the popular impression, only 3% of all intersection casualty accidents occurred on an amber light and 14% on a red light, leaving 83% not associated with automatic traffic signal violations.

Over 80% of these intersection casualty accidents were multiple-vehicle accidents, with only 9% involving pedestrians and 8% involving bicycles. In 43% of the instances one vehicle struck the other at a 90° angle, while 28% involved rear-end collisions. The causes included Failure to Yield the Right of Way (29%), Driving Without Due Care (25%), Unsafe Speed (10%) and Alcohol (9%).

Comparing intersection casualty accidents to non-intersection casualty accidents, the drivers in intersection accidents were older (average age 35 years), carried fewer passengers (65% carried no passengers), and reported a higher frequency of restraint device use. While 67% of the drivers in these accidents were male, half of all male drivers and over half of all female drivers who had casualty traffic accidents in 1985 had them at intersections. The male drivers in these accidents reported lower restraint device use in their vehicles and carried older passengers than did the female drivers. Overall, intersection casualty accidents produced a lower proportion of fatalities and less severe injuries than did non-intersection casualty accidents.

In terms of countermeasures, high-visibility police enforcement campaigns at controlled intersections has shown promise as a way to reduce, at least for the duration of the campaign, driving behaviours that could lead to traffic accidents (Mercer, 1986). However, as two-thirds of intersection accidents occurred at intersections with no traffic signs or signals, or at intersections with only stop signs, and as these sorts of intersections are far too numerous to be included in targetted intersection enforcement campaigns, it follows that driver education dealing with right-of-way and driver courtesy may help to reduce these accidents. Further, as a high proportion of intersection casualty accidents involve rear-end collisions, driver education on following distances might be considered.

The target groups for such education materials ought to focus on adult drivers carrying no passengers who are on the road during "rush hours", and on adult female drivers carrying young passengers. Themes that could prove useful might include the notion of not carrying the day's work stress over into the task of driving home, of responsibility to those waiting at home, and, especially for the female driver, responsibility for her young passengers.

Finally, unlike the speed-and-alcohol traffic accidents that tend not to occur at intersections, intersection casualty accidents appear to be less of a product of "lifestyle" and more of a product of inattention, discourtesy, and perhaps ignorance of the basic rules of the road. Consequently, with a combination of public education and police enforcement programs, there is reason to hope that these accidents could be successfully reduced.

Aspects of Weather-Related Casualty Traffic Accidents, British Columbia, 1984

In 1984 the 2,587 reported weather-related casualty traffic accidents in British Columbia comprised 11.1% of all casualty traffic accidents, caused 3,270 injuries and 48 deaths, and cost the Insurance Corporation of B.C. approximately $52.6 million in insurance payments for medical and other damages. Weather was the fifth most frequently cited cause of casualty traffic accidents, following Driving Without Due Care (29.1%), Failure to Yield Right of Way (17.5%), Alcohol Involvement (15.2%), and Excessive Speed (15.2%), and in sum totalled nearly the number of pedestrian and motorcycle casualty accidents combined.

In many ways the typical weather-related casualty traffic accident resembles the typical alcohol-related casualty traffic accident: both are high-speed single-vehicle runoffs that occur at night at a curve in the road in rural areas and involve young male drivers. The differences between them are that in the one instance the driver's ability is impaired by the driving conditions (rain, snow, ice) and in the other instance the driver's ability is impaired by alcohol.

Finally, it must be stressed that these casualties must not be treated as if there is nothing that can be done to reduce their number and the attendant expense to the province. Short-term, high-intensity public education during periods of elevated risk can reduce alcohol-related accidents, and there is no compelling reason to assume that the same cannot be accomplished with regard to weather-related accidents. Educational programs and campaigns, combined with improved road surface management, have the potential to significantly reduce weather-related casualty traffic accidents in British Columbia.

CAUSES OF FATAL TRAFFIC ACCIDENTS

Coroner and Police (MV104) Accident Cause Frequencies, British Columbia, 1984

A comparison of police (MV104) and coroner reports on the causes of fatal traffic accidents in British Columbia in 1984 revealed substantial differences between the two data sets. Generally, the police portrayed these accidents as primarily the driver's fault, in terms of dangerous and illegal driving

behaviours, with a high proportion of the accidents being alcohol-related. On the other hand, coroners' reports tended to characterize these fatalities as more of a product of circumstances, less as the driver's fault, and less as a consequence of alcohol impairment.

As the police have more experience in accident investigation and have standardized accident investigation protocols and forms, it is likely their data are more reliable than the coroners' written text. However, the difference between these two perspectives needs further investigation. Consequently it is recommended that similar fatal accident protocols and forms be developed for each group so that their perceptions of fatal traffic accident causes can be more accurately compared and agreement on the probable causes achieved.

TRAFFIC ACCIDENT EPIDEMIOLOGY

The Measurement of the Contribution of Alcohol to Fatal Traffic Accidents, British Columbia, 1984.

The relationships among police accident report data, coroner data and Blood Alcohol Content (BAC) levels is examined for a set of fatal traffic accidents. The problems with each data source are discussed and the first step in designing a system combining these sources is suggested.

A Brief Comparison of Injury and Fatal Traffic Accidents for the First Half of 1985 with those for the First Half of 1986

This paper presents driver/passenger information, locations, contributing factors, and collision types for injury and fatal accidents.

Contributing Factors to Casualty Motor Vehicle Crashes in British Columbia, 1985

This is a tabular presentation of some of the primary causes of casualty traffic accidents broken down by police reporting detachments.

The Percentage of Injuries and Deaths Associated with Drinking Driving by Police Jurisdiction: British Columbia, 1985

This report lists, for each police reporting jurisdiction, the number of persons injured and the percentage of those who were injured in alcohol-related traffic accidents. In addition, similar information is presented for fatalities.

Locations of Casualty Motor Vehicle Crashes in British Columbia, 1985

This is a tabular presentation of the locations of casualty traffic accidents (e.g. intersection, bridge) broken down by police reporting detachments.

Types of Casualty Motor Vehicle Crashes in British Columbia, 1985

This is a tabular presentation of the types of casualty accidents (e.g. vehicle-pedestrian, commercial vehicle) by police reporting detachments.

SECTION 1

TRAFFIC CONVICTIONS AND TRAFFIC ACCIDENTS

Frequency, Types and Patterns of Traffic Convictions and
Frequency and Type of Traffic Accidents

Traffic Accident Frequency, Traffic Convictions,
Driver Age and and Driver Gender
British Columbia, June 1980 - December 1984

Frequency, Types and Patterns of Traffic Convictions and Frequency and Type of Traffic Accidents

SUMMARY

These analyses show that a relatively high traffic violation conviction count and relatively frequent and severe traffic accidents are associated with the demographic characteristics of being male and under 30 years of age, and that a relatively small proportion of the drivers (5%) are having a relatively large proportion of the reported accidents (44%).

A factor analytic examination of the pattern and frequency of nine common traffic violations revealed two separate but closely related factors: a "reckless driving" factor marked by speeding, disobeying stop sign, disobeying signs or signals, disobeying red light and speeding in a school zone convictions; and a "drinking-driving" factor marked by 24 hour drinking-driving licence suspension, drinking-driving criminal convictions, excess speed for conditions and speeding convictions. High scores on these factors related to the driver being male and under 30 years of age, to having had relatively frequent traffic accidents and to having had relatively severe traffic accidents. Further, both factors were positively related to traffic accident frequency when the effects of driver age were removed.

The emergence of a reckless driving violation pattern and a drinking-driving violation pattern and their strong relationship to both traffic accident frequency and severity leads to a number of conclusions: First, in addition to following closely in traffic (Evans and Wasielewski, 1982), the driving behaviours loading on the factors can be argued to represent a high-risk driving style that involves speeding, ignoring traffic signs and signals (e.g. red lights, stop signs) and drinking driving.

Second, the existence of a reckless driving factor that is distinct from the drinking driving factor and that is equally predictive of accident involvement allows a wider base of violations to be used to identify high-risk drivers. Thus, not only convicted drinking drivers, but any driver with a violation pattern that resulted in a high score on either the reckless driving or drinking-driving factor could be considered as a high-risk driver. Legislation could thus be considered that would require these drivers to take remedial driver training, and that training ought to relate to all aspects of traffic safety as opposed to focussing on alcohol-related topics.

Finally, the close relationship between the reckless driving factor and the drinking-driving factor argues for the existence of an overall high-risk driving style that includes but is not limited to drinking driving.

Frequency, Types and Patterns of Traffic Convictions and Frequency and Type of Traffic Accidents

Drivers who have traffic accidents are, on the average, different from those who do not. Donovan, Marlatt, and Salzberg (1983) reviewed the literature and found that, when compared to drivers who do not have accidents, drivers who have had accidents are more likely to have the following characteristics: they are male; under 30 years of age; inexperienced; single, widowed, or divorced; from a lower socio-economic level; had been drinking prior to the accident; had been stressed and emotionally upset at the time of the accident; and had personality characteristics that included instability, impulsiveness, thrill seeking, aggression, low frustration tolerance, low self esteem, depression, and the feeling of being controlled by external, rather than internal, forces.

Considering the driving behavior of high accident risk drivers, they have been found to take risks (Jonah, 1986) but perceive less risk (Finn and Bragg, 1986) than older, safer drivers. Their violation history has been found to be relatively bad (Garretson and Peck, 1981; Peck and Kuan, 1983; Smith and Kirkham, 1982; Wasielewski, 1984), and to be stable over time (Miller and Schuster, 1983). In addition they have been found to have had a relatively bad accident history (Evans and Wasielewski, 1982; Garretson and Peck, 1981; Wasielewski, 1984; Wilson and Greensmith, 1983), to drive at high speeds (Wasielewski, 1984; Wilson and Greensmith, 1983), and to follow closely in traffic (Evans and Wasielewski, 1982).

Assuming that there is a personality pattern that runs in a continuum from low-accident-risk drivers to high-risk drivers, it is reasonable also to assume that this pattern would be reflected in a similar continuum of driving style. That is, if high-risk drivers show personality characteristics such as impulsiveness, thrill seeking, aggression and so on, then these characteristics ought to be reflected in impulsive and aggressive driving behaviours such as speeding, running traffic lights and the like, while low-accident-risk drivers should show fewer of these driving characteristics.

Unfortunately, it is logistically difficult to directly observe drivers in sufficient numbers to be able to derive a complete classification of aspects of driving style, in order to relate style to accident risk. However, if one assumes that a driver's traffic violation conviction history to some degree samples the driver's actual driving behaviour, then a pattern in that history ought to reflect driving style. Further, if that pattern can be related to frequency and type of accident (i.e. none, property damage only, injury, fatal), then an accident-risk driving style can begin to be defined.

Finally, if the components of an accident-risk driving style continuum can be defined, then justice system and educational countermeasures can be designed to reduce traffic accident risk in a holistic, as opposed to piecemeal manner. For example, if drinking-driving is only a component of a larger configuration of driving patterns, skills and attitudes, then legislation and

programs focussing only on that aspect might not be expected to be as successful as those that addressed high-risk driving style more comprehensively.

Consequently, it is the purpose of this paper to pursue the notion of a continuum of low-to-high risk driving patterns through an examination of both the frequency and pattern of drivers' traffic violation history and their relationship to traffic accident frequencies and types.

METHOD

Data Sources:

The basis for traffic conviction pattern and frequency data were drawn from a random sample of 9,273 British Columbia driver records taken from the B.C. Ministry of Transportation and Highways driver record database in December, 1984. This sample represents an accurate picture of the approximately 2 million record database with about a 1% error. As the codes for recording offences were changed in June, 1980, all records of offences and traffic accidents prior to that date were deleted.

In order to examine traffic accident types as they relate to conviction frequency and pattern, the 1984 accident records for casualty-producing accidents, along with the associated driver records for the first driver on the accident record, were also examined. This allowed examination of four accident categories and the associated conviction frequencies and patterns: those with no recorded traffic accidents between June 1980 and December 1984 (N=7,250); those with property damage only accidents in that time frame (N=309); those with injury-producing traffic accidents

in 1984 (N=18,854); and those having had a fatal traffic accident in 1984 (N=348). It should be noted that these numbers represent sample sizes, not the relative proportion of drivers in each accident category. From Motor Vehicle Department figures, it is estimated that during the period between June, 1980 and December, 1984, approximately 0.1% of the drivers were in fatal accidents, 4.7% in injury-only accidents, 17.0% in property damage only accidents, and 78.2% had no reported traffic accidents.

Analyses:

Patterns of traffic convictions were determined using an oblique factor analysis on the seven most frequent moving violations plus driving while impaired and the 24-hour drinking driving licence suspension (which is used when the driver is not sufficiently impaired to be charged under the Criminal Code). The two factors that emerged were examined in terms of driver age in 1984, driver gender, traffic accident frequency, and traffic accident type.

RESULTS

Conviction Frequencies:

From the representative sample of 9,273 randomly-drawn driver records it was determined that between June, 1980 and December, 1984 the average British Columbia driver accumulated 1.17 traffic-related convictions (Standard Deviation= 2.22). Male drivers received a statistically significant (t= 27.0, degrees of freedom= 7,665.2, p=.000) higher average number of convictions than did the female drivers (5,353 males: mean= 1.64, SD= 2.67; 3,920 females: mean= 0.54, SD= 1.13).

FIGURE 1.
DRIVER AGE BY # CONVICTIONS (N=9,273)
BRITISH COLUMBIA, JUNE, 1980 - DECEMBER, 1984

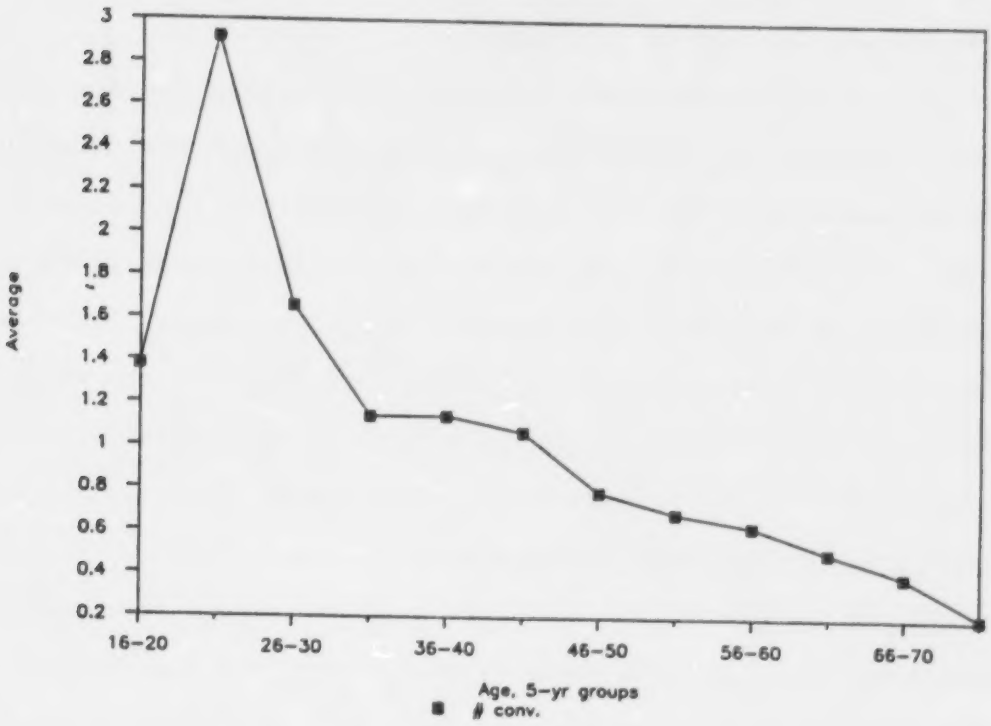


TABLE 1
Recorded Traffic Accidents
British Columbia, June, 1980 - December, 1984

# Recorded Accidents	Persons		Accidents	
	Number	Percent	Number	Percent
0 Rec. Acc.	7,250	78.2%	0	0.0%
1 Rec. Acc.	1,524	16.4%	1,524	56.5%
2+ Rec. Acc.	499	5.4%	1,173	43.5%
TOTAL	9,273	100%	2,696	100%

Note: Average number of accidents per driver = 0.29

Overall, 58.1% of the sample accumulated no convictions during this time period, while the figures for males and females were 48.9% and 70.8% respectively.

Figure 1 illustrates the relationship between average conviction frequency and driver age, with younger drivers generally receiving substantially more frequent convictions than older drivers. The relatively low figure for the 16-20 year group can be explained by the fact that these figures represent the accumulation of convictions over a four year period, while the drop in the 70+ year old category might be explained by suggesting it is the result of less driving rather than a change in driving style.

Reported Traffic Accident Frequencies:

From the sample of 9,273 driver records it was found that between June, 1980 and December, 1984 the average B.C. driver had 0.29 reported traffic accidents with a standard deviation of 0.62 (accidents involving damage over $400, or injury, or death). Male drivers exceeded female drivers in accident frequency (males: mean= 0.36, SD= 0.72, N=5,353; females: mean= 0.19, SD= 0.48, N=3,920) with 73.8% of the males and 84.1% of the females reporting no traffic accidents (t= 13.6, df= 9,196.5, p=.000). Table 1 shows that a relatively small proportion of drivers (5.4%) had a relatively large proportion of reported accidents (43.5%).

Figure 2 illustrates the relationship between reported traffic accident frequency and driver's age, and shows that a higher proportion of drivers with frequent accidents were in the younger age groups (as with Figure 1, the drop in frequency for

FIGURE 2.
ACCIDENT FREQUENCY BY DRIVER'S AGE
JUNE, 1980 - DEC., 1984

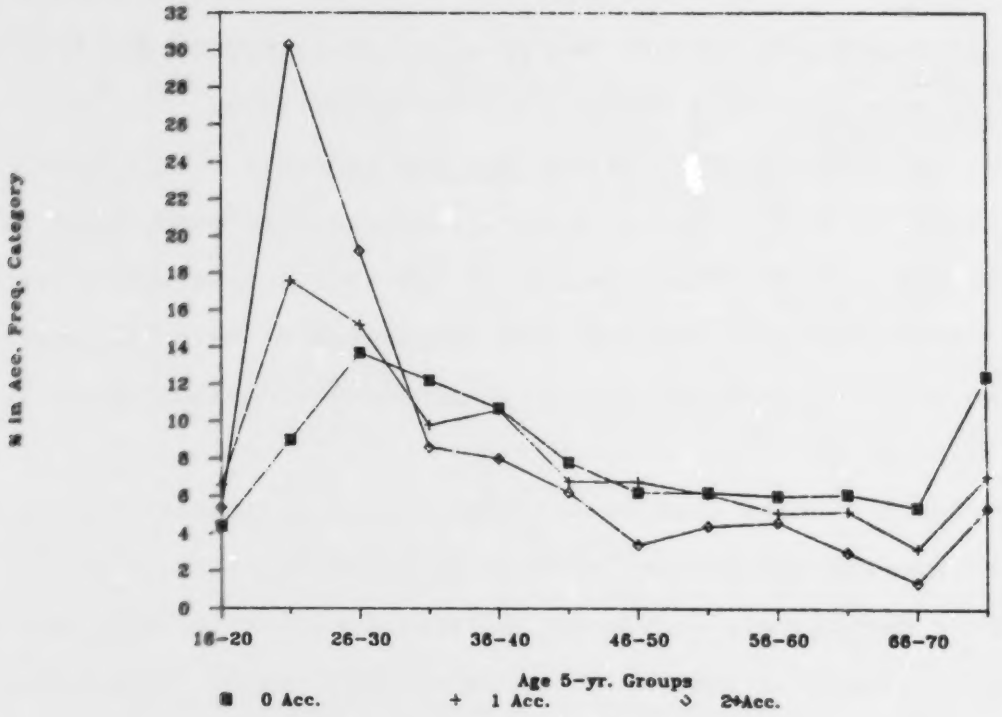


Table 2
Driver Gender by Accident Type.

GENDER	ACCIDENT TYPE			
	NONE (N=7,250)	PROPERTY DAMAGE ONLY (N=309)	INJURY IN 1984 (N=18,854)	FATAL IN 1984 (N=348)
Male	54.5%	67.3%	70.0%	81.9%
Female	45.5%	32.7%	30.0%	18.1%
TOTAL	100.0%	100.0%	100.0%	100.0%

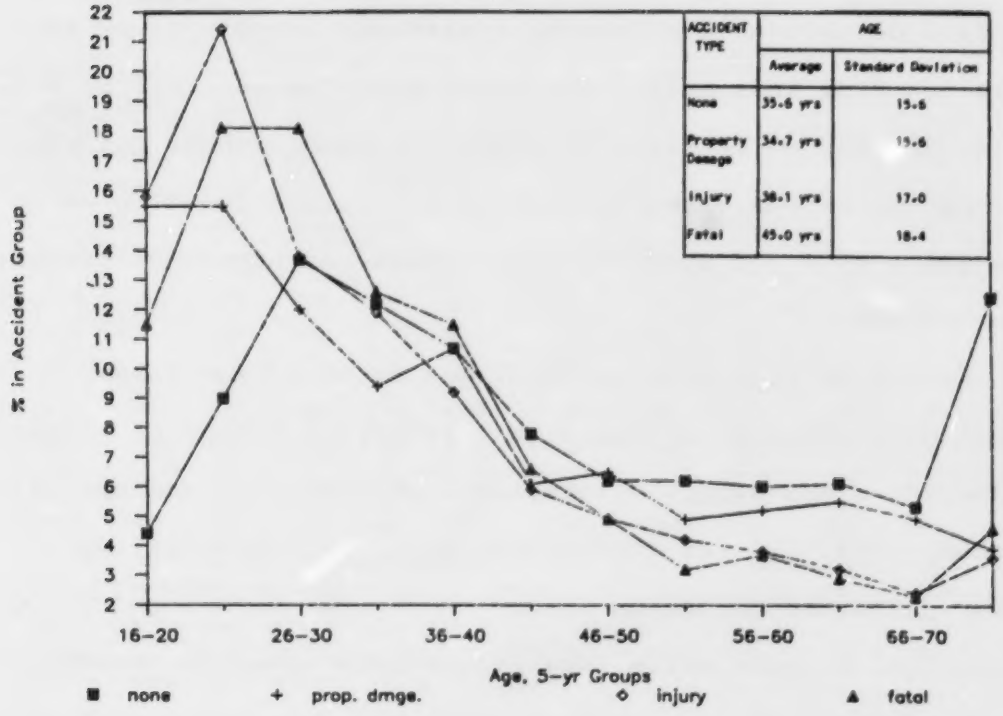
the youngest age group has to do with the cumulative nature of the variable of accident frequency, while the increase in the "no accident" category for the 70+ year old group may be due to less driving more than to a change in driving ability.)

Traffic Accident Type by Driver Age and Gender:

From Table 2 it can be seen that there were over twice as many males as there were females in any accident category (except the "none" category) and that the proportion of males increased as the accident severity category increases (Chi-Square= 17.2, df= 3, p=.001).

Figure 3 shows that those reporting no accidents tend to be on the average the oldest drivers, followed by those with property damage only accidents, a fatal accident in 1984, and an injury accident in 1984. There was a statistically significant difference between the age of drivers with no accidents and drivers with property damage only accidents (t= 6.95, df= 339.6, p.=.000), as well as between the age of drivers with property damage only and drivers with an injury-producing accident (t= 3.49, df= 316.7, p.=.000). However, there was no statistically significant difference between the age of drivers having fatal traffic accidents and those having injury-producing traffic accidents (t= 1.0. df= 352.7, p.=not significant). Similar to the other age-related graphs, the drop in the 16-20 year old category for "no accidents" has to do with the cumulative nature of the measure, while the increase in the 70+ category may have to do with less driving rather than a dramatic increase in driving safety.

FIGURE 3.
DRIVER AGE BY ACCIDENT TYPE



ACCIDENT TYPE	AGE	
	Average	Standard Deviation
None	35.6 yrs	15.6
Property Damage	34.7 yrs	15.6
Injury	38.1 yrs	17.0
Fatal	45.0 yrs	18.4

Conviction Patterns, Driver Age and Driver Gender:

The twelve most frequent convictions were determined from an examination of the 9,273 driver record sample, and their means, standard deviations and inter-correlations are displayed in Table 3. From this matrix the seven most frequent moving violations, driving while impaired violations and 24-hour drinking-driving violations were factored to a 2-factor solution using an eigenvalue of 1 and scree test to assess the number of factors to be extracted.

As can be seen from Table 4, the first factor loaded on speeding, disobeying a stop sign, disobeying a sign or signal, disobeying a red light, disobeying a yellow light and speeding in a school zone. It was interpreted as a "reckless driving" factor. The second factor loaded on 24-hour drinking-driving suspension, driving while impaired, excess speed for conditions and speeding (common to both factors) and was interpreted as a "drinking-driving" factor. Before rotation these factors accounted for 34% of the variance, and after rotation they correlated at 0.16.

Complete-estimation factor scores were calculated for all drivers using mean and standard deviations for the convictions drawn from the 9,273 driver record sample. For crosstabulation purposes these factor scores were divided into "low", "medium", and "high" categories, and the overlap of these scores for the representative sample of drivers can be seen in Figure 4. Clearly there was a strong association between these scores: of those scoring high on the reckless driving factor, 75% also

Table 3
Correlation Matrix of 12 Most Frequent Convictions.
British Columbia, June, 1980 - December, 1984
(n=9,273)

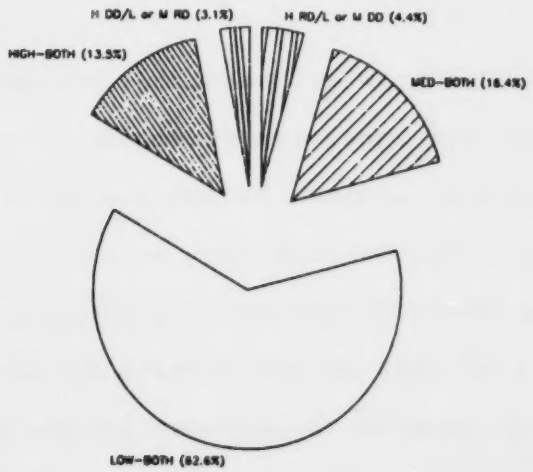
	NDWI	NALC24HR	NNOINS	NNOLIC	NRESDEV	NSPEED	NEXSPCON	NSPDSCH	NREDLT	NYWLGHT	NSTPSGN	NSIGNSIG
NDWI	1.00											
NALC24HR	0.33	1.00										
NNOINS	0.10	0.16	1.00									
NNOLIC	0.12	0.16	0.25	1.00								
NRESDEV	0.08	0.10	0.12	0.21	1.00							
NSPEED	0.11	0.17	0.22	0.35	0.28	1.00						
NEXSPCON	0.11	0.14	0.11	0.11	0.16	0.19	1.00					
NSPDSCH	0.03	0.04	0.04	0.07	0.10	0.16	0.03	1.00				
NREDLT	0.06	0.08	0.08	0.18	0.14	0.18	0.07	0.06	1.00			
NYWLGHT	0.01	0.05	0.11	0.10	0.08	0.18	0.03	0.05	0.06	1.00		
NSTPSIGN	0.05	0.09	0.08	0.14	0.15	0.23	0.08	0.08	0.16	0.08	1.00	
NSIGNSIG	0.02	0.03	0.07	0.15	0.12	0.17	0.04	0.06	0.14	0.10	0.08	1.00
Mean	0.04	0.03	0.02	0.05	0.08	0.59	0.03	0.05	0.04	0.02	0.05	0.05
Standard deviation	0.22	0.20	0.18	0.32	0.32	1.22	0.20	0.25	0.22	0.15	0.24	0.25

NDWI = # driving while impaired convictions
NALC24HR = # 24-hr drinking driving suspensions
NNOINS = # no insurance convictions
NNOLIC = # no licence convictions
NRESDEV = # no restraint device use convictions
NSPEED = # speeding convictions
NEXSPCON = # excessive speed for conditions convictions
NSPDSCH = # speeding in school zone convictions
NREDLT = # disobeying red light convictions
NYWLGHT = # disobeying yellow light convictions
NSTPSIGN = # disobeying stop sign convictions
NSIGNSIG = # disobeying sign or signal convictions

Table 4
Oblique Factor Analysis of Most Frequent Moving Violations, British Columbia, June 1980 - December 1984

CONVICTIONS	OBLIQUE ROTATION FACTOR LOADINGS	
	FACTOR 1 (Reckless Driving)	FACTOR 2 (Drinking Driving)
Driving while impaired (C234,C235,C236)	-.01	.75
24 Hr. drinking driving suspension (M214)	.10	.77
Speeding (M151)	.66	.33
Excess speed for conditions (M149)	.22	.45
Speeding in school zone (M152)	.38	.04
Disobeying red light (M134)	.50	.14
Disobeying yellow light (M133)	.45	-.00
Disobeying stop sign (M187)	.53	.16
Disobeying sign or signal (M163)	.52	-.03

FIGURE 4.
OVERLAP OF RECKLESS DRIVING (RD) AND DRINKING DRIVING (DD) FACTOR SCORES



scored high on the drinking-driving factor, while of those scoring high on the drinking-driving factor, 82% also scored high on the reckless driving factor.

Using the representative sample of driver records, Tables 5 and 6 show that male drivers tended to score higher than female drivers on both the reckless driving and drinking-driving factors. Regarding the reckless driving factor, the average factor score for the males was 0.03 (SD= 0.22, N=5,353) and for the females the average factor score was -0.04 (SD= 0.11, N=3,920), resulting in a statistically significant difference (t= 21.7, df= 8,357.5, p.=.000). Similarly, the average factor score on the drinking driver factor for the males was 0.02 (SD= 0.21) and for the females was -0.04 (SD= 0.08), resulting in a statistically significant difference between the genders (t= 20.4, df= 7112.4, p.=.000).

Finally, from Figures 5 and 6 it can be seen that the "high" factor score category contains a higher proportion of younger drivers than the "low" or "medium" categories for both factors. The drop in the 16-20 year old category in these figures has to do with the cumulative nature of the measures, while the rise in the "low" category for 70+ year olds may have more to do with a reduction in driving frequency than with a change in driving habits.

Conviction Frequency, Type and Pattern and Accident Frequency:

From the representative sample of driver records it was found that those with frequent recorded traffic accidents in B.C. between June, 1980 and December, 1984 also tended to have a

Table 5
Driver Gender by Reckless Driving Factor Score.
British Columbia, June 1980 - December 1984

GENDER	FACTOR SCORE			
	LOW	MEDIUM	HIGH	TOTAL
Male	54.8%	21.3%	24.0%	100.0%
Female	75.1%	15.2%	9.7%	100.0%

Table 6
Driver Gender by Drinking-Driving Factor Score.
British Columbia, June 1980 - December 1984

GENDER	FACTOR SCORE			
	LOW	MEDIUM	HIGH	TOTAL
Male	55.8%	20.9%	23.3%	100.0%
Female	76.4%	16.2%	7.4%	100.0%

FIGURE 5.
DRIVER AGE BY RECKLESS DRIVING FACTOR SCORE(N=9,273)
BRITISH COLUMBIA, JUNE, 1980 - DECEMBER, 1984

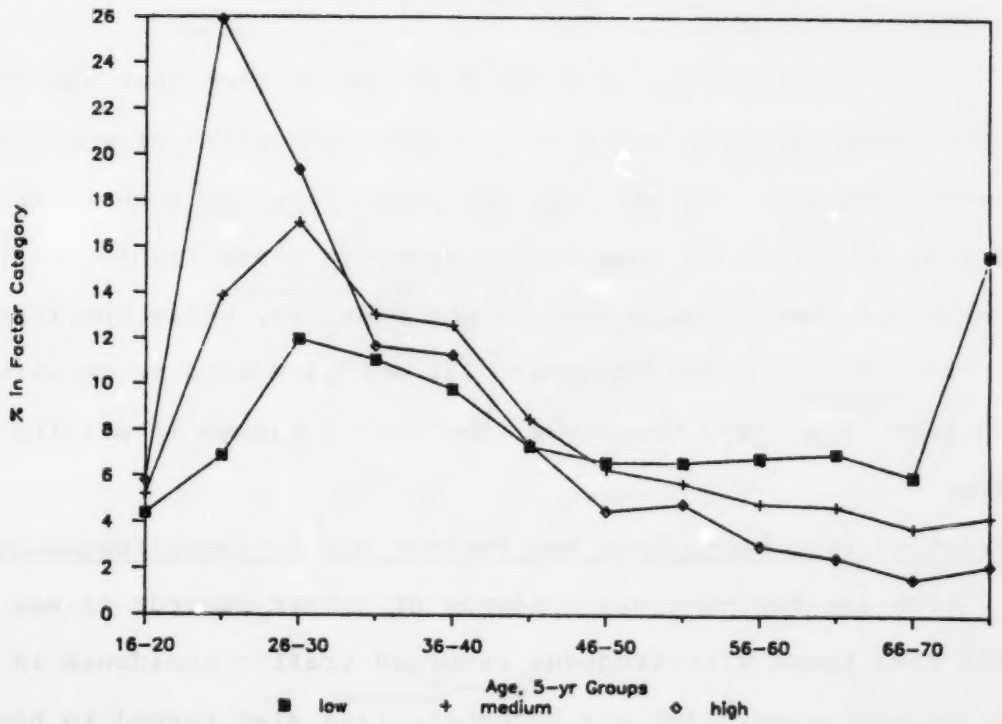
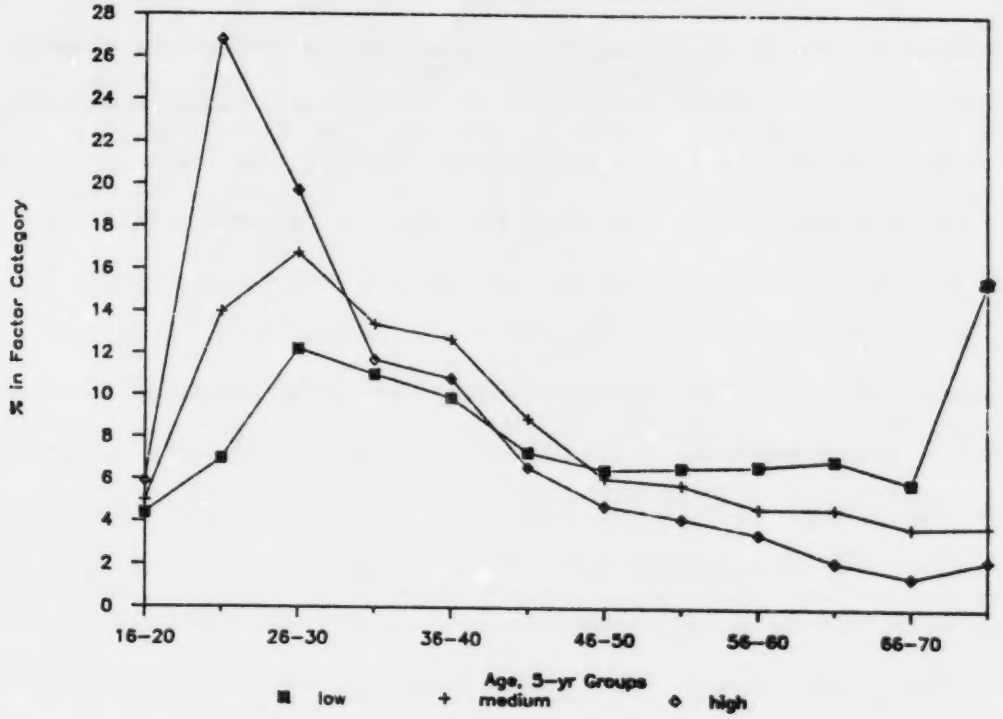


FIGURE 6.
DRIVER AGE BY DRINKING DRIVING FACTOR SCORE (N=9,273)
BRITISH COLUMBIA, JUNE. 1980 - DECEMBER, 1984



high frequency of traffic convictions. For example, of those with no recorded accidents, only about a third had any traffic convictions, while of those drivers with one accident, two-thirds had one or more convictions, and of those with two or more accidents, about 95% had one or more convictions.

Table 7 ranks the ten most frequently cited convictions for those drivers with no recorded accidents, only one recorded accident, and two or more recorded accidents, and rates the frequency of each type of conviction for each of these groups. Overall, those with no recorded accidents averaged 0.76 convictions per driver (SD= 1.56, N=7,253), those with one accident averaged 2.14 convictions per driver (SD= 2.70, N=1,523), and those with two or more recorded accidents averaged 4.26 convictions per driver (SD= 4.39, N=497). There was a statistically significant difference between the average number of convictions of those with no recorded traffic accidents and those with one recorded accident (t= 19.29, df= 1,741.1, p.=.000) and between those with one accident and those with more than one accident (t= 10.15, df= 622.8, p.=.000).

Speeding was the most frequent conviction for all three groups, but those with one accident had over twice the speeding convictions than did those with no accidents, and those with two or more accidents had over four times the number of speeding convictions than did those with no reported accidents. Similarly, those with two or more recorded traffic accidents had eleven times the number of convictions for failure to produce a valid licence, almost five times the number of convictions for failure

TABLE 7
Conviction Ranking and Rates, British Columbia, June, 1980 - Dec. 1984: Drivers with 0 Recorded Accidents, 1 Recorded Accident, 2+ Recorded Accidents

RANK	CONVICTIONS/100 DRIVERS		
	0 Rec. Accidents N=7,250	1 Rec. Accidents N=1,524	2+ Rec. Accidents N= 499
1	M151 Speeding (41.3)	M151 Speeding (100.3)	M151 Speeding (183.5)
2	M217 Failure to wear seat belt (5.7)	M217 Failure to wear seat belt (13.1)	M30 Fail to produce valid licence (31.7)
3	M152 Speeding in school zone (4.2)	M187 Failing to stop at sign (10.0)	C217 Failure to wear seat belt (27.1)
4	M163 Disobey sign/signal (3.5)	M30 Fail to produce valid licence (9.6)	M149 Excess speed/ conditions (22.0)
5	M187 Fail to stop at sign (2.9)	M149 Excess speed/ conditions (9.4)	M134 Fail to stop at red light (15.6)
6	M30 Fail to produce valid licence (2.8)	M152 Speeding in school zone (9.4)	M163 Disobey sign/signal (15.2)
7	M134 Fail to stop at red light (2.6)	M163 Disobey sign/signal (8.2)	M187 Failing to stop at sign (14.4)
8	M214 24 hr. licence suspension (1.6)	M134 Fail to stop at red light (7.0)	M152 Speeding in school zone (11.8)
9	M23 Driving uninsured (1.5)	M214 24 hr. licence suspension (5.8)	M214 24 hr. licence suspension (10.4)
10	M133 Fail to stop @ yellow light (1.5)	M23 Driving uninsured (5.1)	M23 Driving uninsured (8.8)
	Average Overall Number of Convictions per Driver		
	0.76	2.14	4.23

Note: Numbers in parentheses indicate the average number of convictions per hundred drivers in the group. Overall there were 1.17 convictions per driver.

to wear a seatbelt, over six times the number of alcohol-related 24-hour suspensions, six times the number of convictions for failure to stop at a red light, almost six times the number of convictions for driving uninsured and so on, as did those with no recorded accidents.

The information in Table 8 shows that 45.5% of those in the high factor score category on the reckless driving factor and 49.8% of those in the high factor score on the drinking-driving factor had one or more reported traffic accidents between June, 1980 and December, 1984. To illustrate, the average factor score on the reckless driving factor for those with no accidents was -0.03 (SD= 0.14, N=7,253) and for those with one or more accidents was 0.11 (SD= 0.27, N=2,020), resulting in a statistically significant difference between the two groups (t= 21.99, df= 2,344.5, p.=.000). Similarly, on the drinking-driving factor those with no accidents (mean= -0.03, SD= 0.12) scored significantly lower (t= 17.79, df= 2,208.9, p.=.000) than did those with one or more accidents (mean= 0.09, SD= 0.28).

Finally, Table 9 shows that both the reckless driving factor and the drinking-driving factor remain powerful predictors of accident involvement when the effect of drivers' age is removed.

Conviction Frequency, Type and Pattern and Accident Type:

From Table 10 it can be seen that drivers with property damage only accidents had on the average twice the number of traffic convictions between June, 1980 and December, 1984 as did those with no reported accidents, while those with injury or fatal accidents had on the average almost four times the number

Table 8
Total Number of Recorded Accidents by Factor Scores. (N=9,273)
British Columbia, June 1980 - December 1984

FACTOR	PERCENT WITH 1 OR MORE ACCIDENTS			
	LOW	MEDIUM	HIGH	TOTAL
Reckless Driving Factor	12.7%	29.9%	45.5%	100.0%
Drinking Driving Factor	12.8%	28.1%	49.8%	100.0%

TABLE 9
Zero-Order and Partial Correlations Among Reckless Driving Factor, Drinking-driving Factor, Number of Reported Traffic Accidents, and Drivers' Age. (N=9,273)

	RDF	DDF	# Accd.	Driver Age
Reckless Driving Factor (RDF)		0.50	0.36	-0.25
Drinking Driving Factor (DDF)	0.47		0.31	-0.19
# Reported accidents	0.34	0.29		-0.15

UPPER DIAGONAL - Zero-Order Correlations.
LOWER DIAGONAL - Partial Correlation Controlling for Driver Age.

Table 10
Charges/100 Drivers by Traffic Accident Types (standard type).
Percentage with 1 or More Convictions (in boldface).
British Columbia, June 1980 - December 1984

CONVICTIONS	ACCIDENT TYPES			
	No accidents N = 7,250	Property damage only N = 309	Injury Accd. in 1984 N = 18,854	Fatal Accd. in 1984 N = 348
Driving while impaired (C234,C235,C236)	2.1 **1.8%**	7.8 **5.8%**	11.1 **8.7%**	17.2 **13.2%**
24 Hr. drinking driving suspension (M214)	1.6 **1.4%**	4.2 **2.9%**	11.5 **9.2%**	16.1 **12.9%**
Speeding (M151)	41.4 **23.2%**	87.2 **44.3%**	145.1 **55.7%**	135.3 **57.2%**
Excess speed for conditions (M149)	0.5 **0.5%**	11.3 **10.7%**	23.5 **10.0%**	14.4 **12.1%**
Speeding in school zone (M152)	4.2 **3.8%**	7.8 **7.4%**	10.5 **9.5%**	6.0 **5.5%**
Red light (M134)	2.6 **2.4%**	4.9 **4.2%**	12.6 **11.0%**	8.9 **8.0%**
Yellow light (M133)	1.5 **1.4%**	4.2 **3.6%**	4.7 **4.4%**	2.9 **2.9%**
Stop sign (M187)	2.9 **2.5%**	8.4 **7.1%**	12.3 **10.8%**	10.1 **8.9%**
Sign or signal (M163)	3.5 **3.2%**	8.4 **5.8%**	10.3 **8.8%**	5.2 **4.3%**
Driving without a licence (M30)	2.8 **2.3%**	5.5 **4.5%**	17.1 **11.4%**	17.2 **11.2%**
Driving without insurance (M23)	1.5 **1.4%**	5.8 **2.3%**	9.5 **7.0%**	9.6 **7.8%**
Not wearing seat belt (M217)	5.7 **5.1%**	13.6 **10.4%**	21.3 **16.9%**	16.7 **13.2%**
ALL CONVICTIONS	76.0 **33.0%**	191.1 **67.6%**	329.0 **82.0%**	282.1 **74.4%**

of convictions as those with no reported accidents. Those with no reported accidents averaged 0.75 convictions (SD= 1.56, N=7,253), while those with property damage only accidents averaged 1.91 convictions (SD= 2.42, N=309) resulting in a statistically significant difference between the groups (t= 8.34, df= 319.0, p.=.000). Those with an injury accident in 1984 averaged 3.29 convictions (SD= 3.63, N=18,854), and this value was significantly greater than the number of convictions for the property damage only group (t= 9.83, df= 331.2, p.=.000). Interestingly, the average number of convictions for those having had a fatal accident in 1984 (mean= 2.82, SD= 3.43, N=348) was signifcantly smaller than for those having an injury-only accident (t= 3.29, df= 654.5, p.=.000).

Further, specific conviction types tended to discriminate among the accident-type groups: Those with property damage only accidents had on the average about twenty-three times the number of excessive speed for conditions and about four times the driving without insurance and driving while impaired convictions as did those with no reported accidents. Those drivers with an injury only accident in 1984 had on the average forty-seven times more excessive speed for conditions convictions, seven times more 24 hour drinking-driving licence suspension convictions, over six times more driving without insurance and driving without a licence convictions, over five times more driving while impaired convictions, almost five times more red light convictions, and about four times more stop sign and not wearing a seat belt

convictions as did those with no reported accidents. Finally, those with a fatal accident in 1984 had on the average twenty-nine times the excessive speed for conditions convictions, ten times the 24 hr. drinking-driving licence suspension convictions, over eight times the driving while impaired convictions and over six times the driving without insurance and driving without a valid licence convictions as did those in the no reported traffic accident category.

Turning to violation patterns, Table 11 shows that the reckless driving factor discriminates among the traffic accident type groups and Table 12 shows that the drinking driving factor also discriminates among those groups. Both tables are combined graphically in Figure 7. To elaborate: those in the property damage only accident group were about three times as likely to score "high" on the reckless driving factor and on the drinking-driving factor as were those in the no accident group; those in the injury accident group were almost four times as likely to score "high" on the reckless driving factor and almost five times a likely to score "high" on the drinking-driving factor as were those in the no accident group; and those in the fatal accident group were almost three times as likely to score "high" on the reckless driving factor and almost five times as likely to score high on the drinking-driving factor as were those in the no accident group.

On the reckless driving factor scores there was a statistically significant difference (t= 7.0, df= 319.3, p=.000) between those in the no accident group (mean= -0.03, SD= 0.14, N=7,253)

Table 11
Accident Type by Reckless Driving Factor Scores.
British Columbia, June 1980 - December 1984

ACCIDENT TYPE	RECKLESS DRIVING FACTOR SCORES			
	LOW	MEDIUM	HIGH	TOTAL
None	70.7%	16.8%	12.5%	100.0%
Property Damage	41.1%	27.2%	31.7%	100.0%
Injury	28.2%	25.5%	46.3%	100.0%
Fatal	31.0%	33.3%	35.6%	100.0%

Table 12
Accident Type by Drinking Driving Factor Scores.
British Columbia, June 1980 - December 1984

ACCIDENT TYPE	DRINKING DRIVING FACTOR SCORES			
	LOW	MEDIUM	HIGH	TOTAL
None	72.0%	17.4%	10.6%	100.0%
Property Damage	43.7%	26.5%	29.8%	100.0%
Injury	28.5%	20.3%	51.2%	100.0%
Fatal	28.2%	23.3%	48.6%	100.0%

FIGURE 7.
ACCIDENT TYPE BY FACTOR SCORES

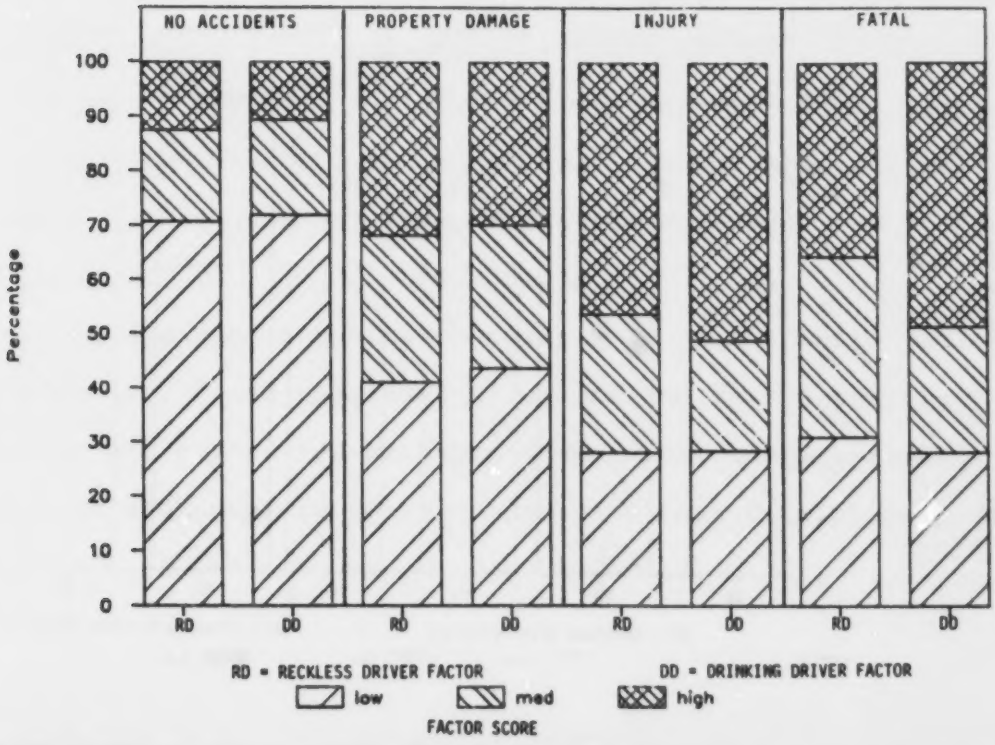


Table 13
Traffic Accidents by Reckless Driving Factor Scores,
British Columbia, June 1980 - December 1984

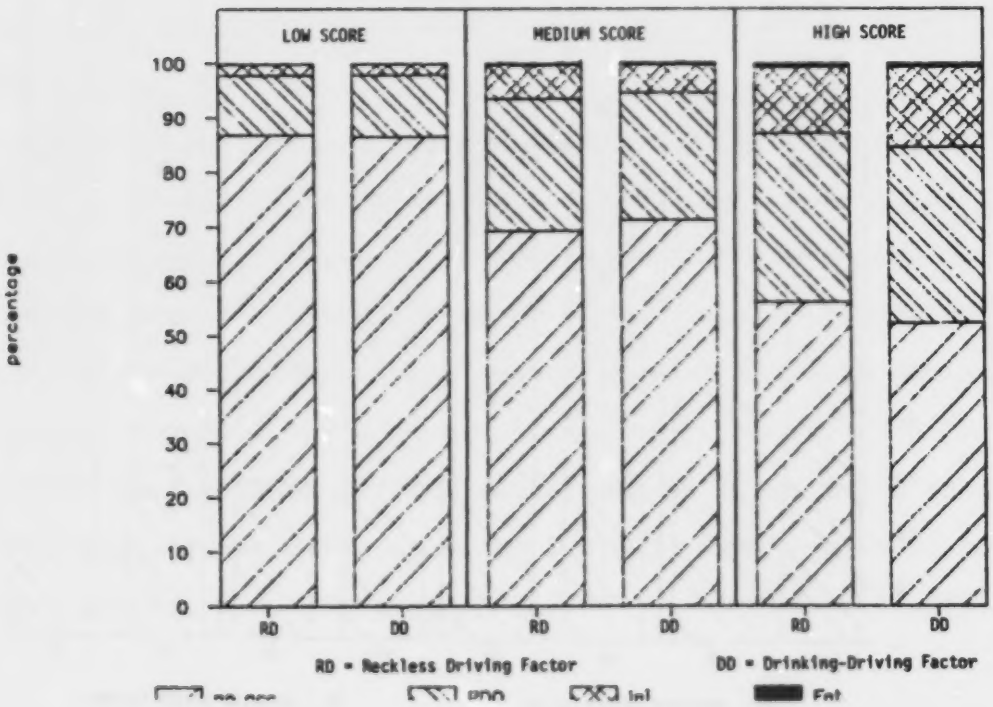
ACCIDENT TYPE	RECKLESS DRIVING FACTOR SCORES		
	LOW	MEDIUM	HIGH
None	86.91%	69.20%	56.19%
Property Damage	11.00%	24.30%	30.96%
Injury	2.04%	6.34%	12.61%
Fatal	0.05%	0.16%	0.23%
TOTAL	100%	100%	100%

Table 14
Traffic Accidents by Drinking Driving Factor Scores,
British Columbia, June 1980 - December 1984

ACCIDENT TYPE	DRINKING DRIVING FACTOR SCORES		
	LOW	MEDIUM	HIGH
None	86.56%	71.02%	52.37%
Property Damage	11.38%	23.50%	32.18%
Injury	2.00%	5.22%	15.14%
Fatal	0.05%	0.26%	0.32%
TOTAL	100%	100%	100%

Figure 8.

FACTOR SCORES BY ACCIDENT TYPE



and those in the property damage only group (mean= 0.06, SD= 0.22, N=309), a statistically significant difference (t= 34.1, df= 326.3, p=.000) between those in the property damage only group and those in the injury only group (mean= 0.16, SD= 0.29, N=18,854), and a statistically significant difference (t= 4.0, df= 363.7, p=.000) between those in the injury only group and those in the fatal accident group (mean= 0.10, SD= 0.26, N=348).

Finally, on the drinking-driving factor scores, there was a statistically significant difference (t= 5.7, df= 313.9, p=.000) between those in the no accident group (mean= -0.03, SD= 0.12, N=7,253) and those in the property damage only group (mean= 0.05, SD= 0.24, N=309), a statistically significant difference (t= 7.0, df= 326.9, p=.000) between those in the property damage only group and those in the injury only group (mean= 0.15, SD= 0.33, N=18,854), and no statistically significant difference (t= 0.71, df= 359.0, p=.5) between those in the fatal accident group (mean= 0.17, SD= 0.34, N=348).

Tables 13 and 14 and Figure 8 show that the higher a driver scored on either factor, the more likely that the driver will have been involved in any type of traffic accident.

CONCLUSIONS

These analyses show that a relatively high traffic violation conviction count and relatively frequent and severe traffic accidents are associated with the demographic characteristics of being male and under 30 years of age, and that a relatively small

proportion of the drivers (5%) are having a relatively large proportion of the reported accidents (44%).

A factor analytic examination of the pattern and frequency of nine common traffic violations revealed two separate but closely related factors: a "reckless driving" factor marked by speeding, disobeying stop sign, disobeying signs or signals, disobeying red light and speeding in a school zone convictions; and a "drinking-driving" factor marked by 24 hour drinking-driving licence suspension, drinking-driving criminal convictions, excess speed for conditions and speeding convictions. High scores on these factors related to the driver being male and under 30 years of age, to having had relatively frequent traffic accidents and to having had relatively severe traffic accidents. Further, both factors were positively related to traffic accident frequency when the effects of driver age were removed.

The emergence of a reckless driving violation pattern and a drinking-driving violation pattern and their strong relationship to both traffic accident frequency and severity leads to a number of conclusions: First, in addition to following closely in traffic (Evans and Wasielewski, 1982), the driving behaviours loading on the factors can be argued to represent a high-risk driving style that involves speeding, ignoring traffic signs and signals (e.g. red lights, stop signs) and drinking driving.

Second, the existence of a reckless driving factor that is distinct from the drinking driving factor and that is equally predictive of accident involvement allows a wider base of violations to be used to identify high-risk drivers. Thus, not only

convicted drinking drivers, but any driver with a violation pattern that resulted in a high score on either the reckless driving or drinking-driving factor could be considered as a high-risk driver. Legislation could thus be considered that would require these drivers to take remedial driver training, and that training ought to relate to all aspects of traffic safety as opposed to focussing on alcohol-related topics.

Finally, the close relationship between the reckless driving factor and the drinking-driving factor argues for the existence of an overall high-risk driving style that includes but is not limited to drinking driving.

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**Traffic Accident Frequency, Traffic Convictions,
Driver Age and and Driver Gender
British Columbia, June 1980 - December 1984**

SUMMARY

The results of these analyses suggest that a relatively small proportion of the drivers (5%) are having a relatively large proportion of the traffic accidents (44%), and that these drivers tend to be young males. In terms of traffic-related convictions, those with frequent accidents have a record of frequent convictions, especially convictions having to do with speeding and intersection behaviours (e.g. red light, yellow light, stop sign). In addition, they are more likely to not wear seat belts, to not be able to produce a valid driver's licence, and to be driving uninsured.

TABLE 6
Conviction Ranking and Rates, British Columbia, June, 1980 - Dec. 1984:
Drivers with 0 Recorded Accidents, 1 Recorded Accident, 2+ Recorded Accidents

RANK	CONVICTIONS/100 DRIVERS		
	0 Rec. Accidents N=7,250	1 Rec. Accidents N=1,524	2+ Rec. Accidents N= 499
1	M151 Speeding (41.3)	M151 Speeding (100.3)	M151 Speeding (183.58
2	M217 Failure to wear seat belt (5.7)	M217 Failure to wear seat belt (13.1)	M30 Fail to produce valid licence (31.7)
3	M152 Speeding in school zone (4.2)	M187 Failing to stop at sign (10.0)	C217 Failure to wear seat belt (27.1)
4	M163 Disobey sign/signal (3.5)	M30 Fail to produce valid licence (9.6)	M149 Excess speed/ conditions (22.0)
5	M187 Fail to stop at sign (2.9)	M149 Excess speed/ conditions (9.4)	M134 Fail to stop at red light (15.6)
6	M30 Fail to produce valid licence (2.8)	M152 Speeding in school zone (9.4)	M163 Disobey sign/signal (15.2)
7	M134 Fail to stop at red light (2.6)	M163 Disobey sign/signal (8.2)	M187 Failing to stop at sign (14.4)
8	M214 24 hr. licence suspension (1.6)	M134 Fail to stop at red light (7.0)	M152 Speeding in school zone (11.8)
9	M23 Driving uninsured (1.5)	M214 24 hr. licence suspension (5.8)	M214 24 hr. licence suspension (10.4)
10	M133 Fail to stop @ yellow light (1.5)	M23 Driving uninsured (5.1)	M23 Driving uninsured (8.8)
	Average Overall Number of Convictions per Driver		
	0.76	2.14	4.23

Note: Numbers in parentheses indicate the average number of convictions per hundred drivers in the group.

TRAFFIC ACCIDENT FREQUENCY, TRAFFIC CONVICTIONS, DRIVER AGE AND DRIVER GENDER. BRITISH COLUMBIA, JUNE 1980 - DECEMBER 1984

The term "accident" implies a random event without an apparent cause. However, when this term is used within the context of traffic collisions it can be somewhat misleading. That is, traffic accidents have definable causes, and more often than not the causes involve human error (see, for example, Mercer, 1984, pp. 13-28). Further, some humans appear to be more prone to error than are others, as witnessed by the finding that convicted drinking drivers have, in addition to drinking-driving convictions, a relatively high number of other traffic related convictions and a relatively high number of traffic accidents (Mercer, 1986, pp. 92-110).

It is the purpose of this paper to pursue this notion that, at least for some individuals, traffic "accidents" are the almost inevitable consequence of their driving behaviours. This will be accomplished through an examination of drivers' accident history, traffic conviction history, age and gender.

METHOD

In order to examine the relationship between driver's reported traffic accident history and driving-related conviction record, age, and gender, a random sample of 9,273 British Columbia driver records was taken from the British Columbia Ministry of Transportation and Highways driver record data base in December, 1984. The sample was then written into a fixed format flat file read by SPSS-X to allow analyses of the

records. This sample represents an accurate picture of the approximately two million record data base with about 1% error in either direction. As the codes for recording offences were changed in June, 1980, all records of offences and traffic accidents prior to that date were deleted in order to reduce computer analysis costs.

Analyses

Driver records were sorted into three groups: those drivers with no recorded traffic accidents between June 1980 and December 1984 (N=6,928), those drivers with only one traffic accident between those dates (N=1,691), and those with two or more between those dates (N=648). Comparisons were then made among these groups in terms of traffic-related convictions, age in 1984, and gender.

RESULTS AND DISCUSSION

From Table 1 it can be seen that a relatively small proportion of the drivers (5.4%) are having a relatively large proportion of the traffic accidents (43.5%). Table 2 shows that those having more frequent traffic accidents tend to be male (80.4%), while Table 3 and Figure 1 show that those with the higher numbers of traffic accidents are most likely to be between 21 and 25 years of age.

On the other hand, Table 4 and Figure 2 show that, while the 21-25 year old driver group has the highest proportion of drivers who have frequent traffic accidents (14.0%), about 4% of the drivers between 31 and 60 years of age have had two or more accidents in the time period under consideration, which is close

TABLE 1
Recorded Traffic Accidents and Recorded Convictions
British Columbia, June, 1980 - December, 1984

# Recorded Accidents	Persons		Accidents	
	Number	Percent	Number	Percent
0 Rec. Acc.	7,250	78.2%	0	0.0%
1 Rec. Acc.	1,524	16.4%	1,524	56.5%
2+ Rec. Acc.	499	5.4%	1,173	43.5%
TOTAL	9,273	100%	2,696	100%

Note: Average number of accidents per driver = 0.29

TABLE 2
Recorded Traffic Accidents by Drivers' Sex: Row Percentages
British Columbia, June, 1980 - December, 1984

# Recorded Accidents	Sex		
	MALE N=5,353	FEMALE N=3,920	TOTAL N=9,273
0 Rec. Acc. N=7,250	54.5	45.5	100.0%
1 Rec. Acc. N=1,524	65.6	34.4	100.0%
2+ Rec. Acc. N=499	80.4	19.6	100.0%
TOTAL SAMPLE	57.7	42.3	100.0%

TABLE 3
Recorded Traffic Accidents by Drivers' Ages: Row Percentages
British Columbia, June, 1980 - December, 1984

# Rec. Acc.	AGE												
	16-20	21-25	26-30	31-35	36-40	41-45	46-50	51-55	56-60	61-65	66-70	70+	TOTAL %
0 Rec. Acc. N=7250	4.4	9.0	13.7	12.2	10.7	7.8	6.2	6.2	6.0	6.1	5.4	12.4	100%
1 Rec. Acc. N=1524	6.6	17.8	15.2	9.8	10.6	6.8	6.8	6.1	5.1	5.2	3.2	7.1	100%
2+ Rec Acc. N=499	5.4	30.3	19.2	8.6	8.0	6.2	3.4	4.4	4.6	3.0	1.4	5.4	100%
TOTAL SAMPLE	4.8	11.6	14.3	11.0	10.6	7.5	6.2	6.1	5.8	5.8	4.8	11.1	100%

FIGURE 1

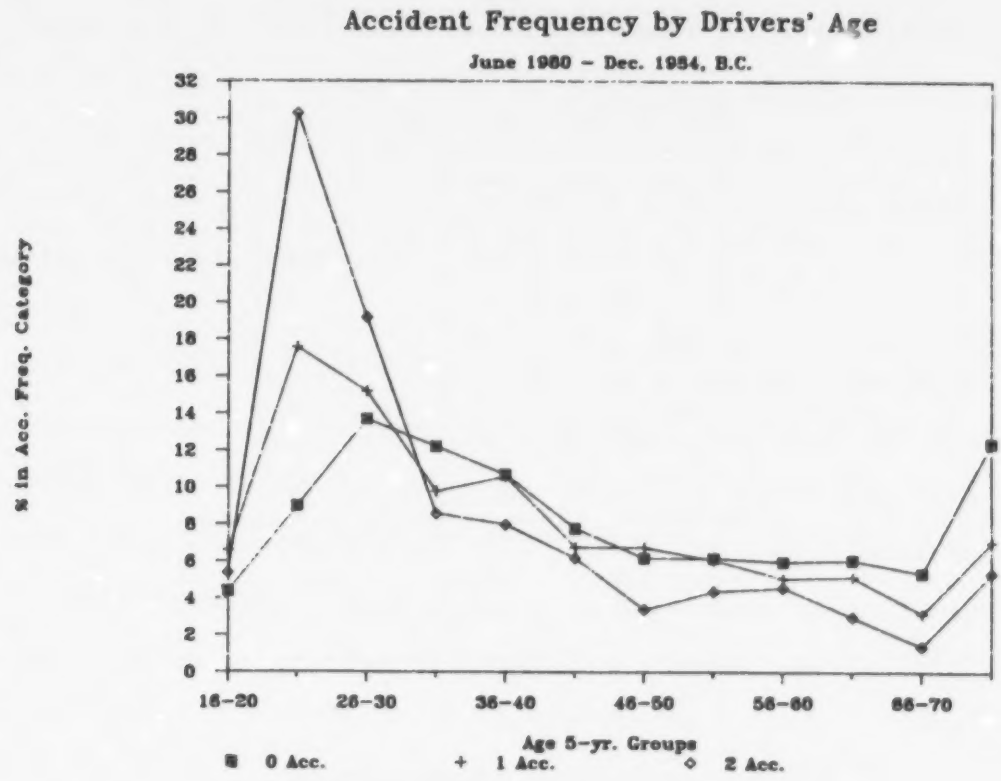

TABLE 4
Recorded Traffic Accidents by Drivers' Age: Column Percentage
British Columbia, June, 1980 - December, 1984

# Rec Acc.	AGE												MEAN
	16-20 N=444	21-25 N=1075	26-30 N=1324	31-35 N=1075	36-40 N=979	41-45 N=698	46-50 N=571	51-55 N=562	56-60 N=535	61-65 N=534	66-70 N=444	71+ N=1032	
0 Rec Acc.	71.2	61.0	75.2	82.0	79.5	80.8	79.0	79.5	81.3	82.4	87.4	86.9	78.2
1 Rec Acc.	22.7	24.9	15.2	14.0	16.4	14.8	18.0	16.5	14.4	14.8	11.0	10.5	16.4
2+ Rec. Acc.	6.1	14.0	7.3	4.0	4.1	4.4	3.0	3.9	4.3	2.8	1.6	2.6	5.4
TOTAL %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %

to the overall average of 5.4%. The point is that, although younger drivers tend to be involved in frequent accidents, older driver age groups also have a significant proportion of drivers with frequent traffic accidents.

Table 5 shows that drivers with frequent traffic accidents have a relatively high number of traffic-related convictions. For example, of those with no recorded accidents, only about a third had any traffic convictions, while of those drivers with one accident, two-thirds had one or more convictions, and of those with two or more accidents, about 95% had one or more convictions.

Table 6 ranks the ten most frequently cited convictions for each of the three groups, and rates the frequency of each type of conviction for each group. Overall, those with no recorded accidents averaged 0.76 convictions per driver, those with one accident averaged 2.14 convictions per driver, and those with two or more recorded accidents averaged 4.23 convictions per driver. Speeding was the most frequent conviction for all three groups, but those with one accident had over twice the speeding convictions than did those with no accidents, and those with two or more accidents had over four times the number of speeding convictions than did those with no reported accidents. Similarly, those with two or more recorded traffic accidents had eleven times the number of convictions for failure to produce a valid licence, almost five times the number of convictions for failure to wear a seatbelt, over six times the number of alcohol-related 24-hour suspensions, six times the number of convictions for

FIGURE 2

Accident Frequency by Drivers' Age

June 1980 - Dec. 1984, B.C.

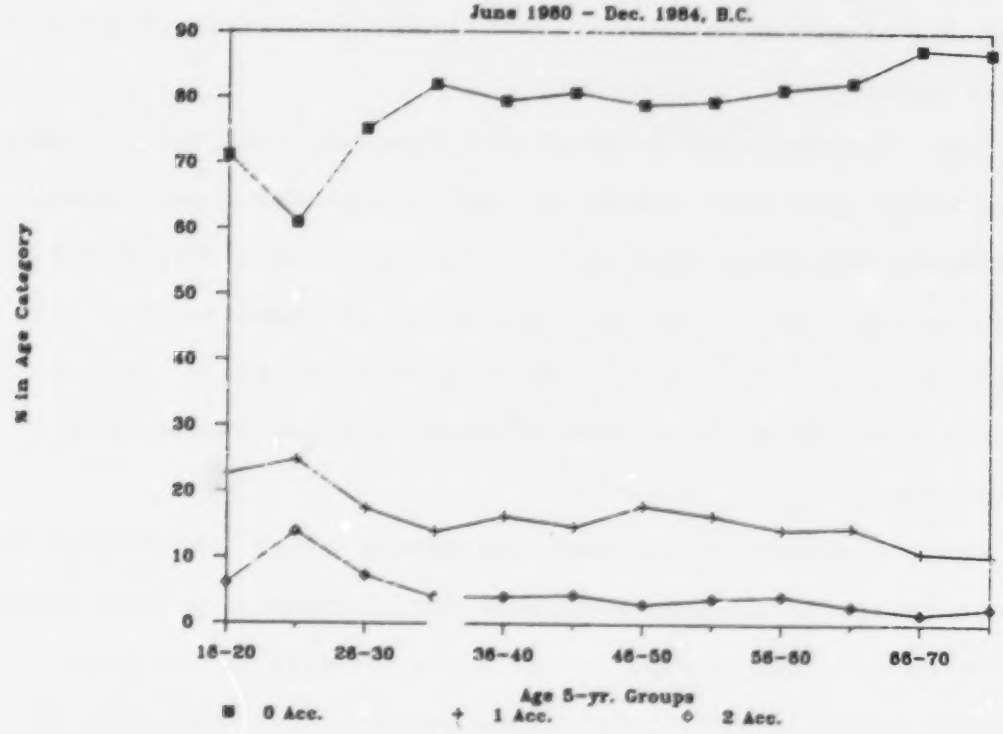

TABLE 5
Recorded Traffic Accidents by Recorded Convictions
British Columbia, June, 1980 - December, 1984

# Recorded Accidents	Recorded Convictions						
	0 Conv.	1 Conv.	2 Conv.	3 Conv.	4 Conv.	5+ Conv.	TOTAL %
0 Rec. Acc.	66.5	16.5	7.5	3.9	2.1	3.5	100.0
1 Rec. Acc.	32.5	23.8	13.3	9.3	6.3	14.8	100.0
2+ Rec. Acc.	15.2	14.6	12.6	13.2	9.2	35.2	100.0

TABLE 6
Conviction Ranking and Rates, British Columbia, June, 1980 - Dec. 1984: Drivers with 0 Recorded Accidents, 1 Recorded Accident, 2+ Recorded Accidents

RANK	CONVICTIONS/100 DRIVERS		
	0 Rec. Accidents N=7,250	1 Rec. Accidents N=1,524	2+ Rec. Accidents N= 499
1	M151 Speeding (41.3)	M151 Speeding (100.3)	M151 Speeding (183.58
2	M217 Failure to wear seat belt (5.7)	M217 Failure to wear seat belt (13.1)	M30 Fail to produce valid licence (31.7)
3	M152 Speeding in school zone (4.2)	M187 Failing to stop at sign (10.0)	C217 Failure to wear seat belt (27.1)
4	M163 Disobey sign/signal (3.5)	M30 Fail to produce valid licence (9.6)	M149 Excess speed/ conditions (22.0)
5	M187 Fail to stop at sign (2.9)	M149 Excess speed/ conditions (9.4)	M134 Fail to stop at red light (15.6)
6	M30 Fail to produce valid licence (2.8)	M152 Speeding in school zone (9.4)	M163 Disobey sign/signal (15.2)
7	M134 Fail to stop at red light (2.6)	M163 Disobey sign/signal (8.2)	M187 Failing to stop at sign (14.4)
8	M214 24 hr. licence suspension (1.6)	M134 Fail to stop at red light (7.0)	M152 Speeding in school zone (11.8)
9	M23 Driving uninsured (1.5)	M214 24 hr. licence suspension (5.8)	M214 24 hr. licence suspension (10.4)
10	M133 Fail to stop @ yellow light (1.5)	M23 Driving uninsured (5.1)	M23 Driving uninsured (8.8)
	Average Overall Number of Convictions per Driver		
	0.76	2.14	4.23

Note: Numbers in parentheses indicate the average number of convictions per hundred drivers in the group.

failure to stop at a red light, almost six times the number of convictions for driving uninsured and so on, as did those with no recorded accidents. Clearly, from these conviction records it can be reasonably argued that those drivers with more frequent traffic accidents display more frequent dangerous driving behaviours than do those drivers with less frequent traffic accidents, and that speeding-related and intersection-related (e.g. red light, yellow light, stop sign) driving behaviours are central to their bad driving records.

CONCLUSIONS

The results of these analyses suggest that a relatively small proportion of the drivers (5%) are having a relatively large proportion of the traffic accidents (44%), and that these drivers tend to be young males. In terms of traffic-related convictions, those with frequent accidents have a record of frequent convictions, especially convictions having to do with speeding and intersection behaviours (e.g. red light, yellow light, stop sign). In addition, they are more likely to not wear seat belts, to not be able to produce a valid driver's licence, and to be driving uninsured.

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SECTION 2

TRAFFIC ACCIDENT TYPES

Fatality-Producing vs. Injury-Only Traffic Accidents: Trends, Characteristics, Persons Involved, and Consequences
British Columbia, 1985

Intersection Casualty Accidents: Trends, Characteristics, Persons Involved, and Consequences
British Columbia, 1985

Aspects of Weather-Related Casualty Traffic Accidents
British Columbia, 1984

Fatality-Producing *vs.* Injury-Only Traffic Accidents: Trends, Characteristics, Persons Involved, and Consequences British Columbia, 1985

SUMMARY

To summarize, the proportion of fatality-producing to injury-only casualty traffic accidents has gradually declined over the past 10 years to a 1985-86 level of 1.7%, with the highest seasonal proportion occurring during the summer months. While the charge history of drivers in injury-only accidents is similar to that of drivers in fatal accidents (Mercer, 1986), accident characteristics and other driver characteristics differ between the typical fatal and typical injury-only traffic accident.

From these analyses the typical fatal accident in B.C. in 1985 occurred on a rural, high-speed road in the dark on a weekend. It most likely involved a single vehicle that either failed to negotiate a curve, or simply ran off the side of a straight road while if a second vehicle was involved there was often a head-on collision. The most frequent contributing factors to the accident were excessive speed and/or alcohol.

Drivers in fatal accidents were most frequently male (80%). About 45% of the male drivers 34 years of age or older carried passengers, and the passengers were slightly more likely to be male than female, while half of the younger male drivers carried passengers and the passengers were much more likely to be male than female. On the other hand, about 56% of both younger and older female drivers in fatal accidents carried passengers, and the passengers were much more likely to be female than male. Further, occupants of vehicles driven by males were less likely to wear restraint devices than were occupants in vehicles driven by females. Finally, the average age of male victims in fatal accidents was 33 years and female victims was 39 years.

In contrast, a typical injury-only accident occurred on an urban, 50 kph road in the daylight during the evening "rush hours". It most likely involved one vehicle which rear-ended or struck another vehicle at 90° at an intersection. The most frequent contributing factors were driving without due care and/or failure to yield the right of way.

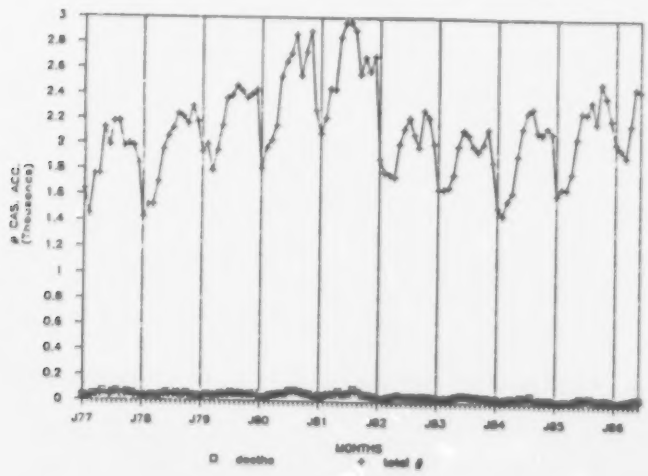
There was a higher proportion of female drivers in injury-only accidents than in fatal accidents, although the majority of drivers in injury-only accidents (70%) were male. Overall, drivers in injury-only accidents were less likely to carry passengers than were drivers in fatal accidents. A third of the male drivers 34 years of age or older carried passengers and the passengers were slightly more likely to male than female, while 39% of the younger male drivers carried passengers and the passengers were appreciably more likely to be male. On the other hand, while fewer of the older female drivers carried passengers than did the younger female drivers, in all cases the passengers were more likely to be female than male. Restraint device use rates were similar for occupants of vehicles driven by males as

for vehicles driven by females. Finally, the average victim age for both males and females in these injury-only accidents was less than for victims of fatal accidents, with an average male victim age of 30 years and an average female victim age of 33 years.

Admittedly, every traffic accident is unique, and within both the fatal and injury-only categories there are a number of subsets that have not been addressed (e.g. pedestrian, commercial vehicle, motorcycle). However, in order to design counter-measures and identify target groups, accident types need to be characterized. Indeed, the young male drinking driver in a high-speed, night-time, single-vehicle crash is a well-recognized central figure in fatal accidents. However, when injury-only casualty accidents are contrasted with fatal accidents, other important and exponentially more common accident configurations emerge. For example, the female driver becomes a very significant factor, accounting for almost a third of the drivers in injury-only accidents, while the older male driver with no passengers going through intersections during "rush hours" also gains in importance. Also of central importance in injury-only accidents are the contributing factors of carelessness and failure to yield, and the daytime and during the week as accident times.

It follows that to further reduce traffic accident frequencies, educators and policy-makers might expand public education programs and police enforcement priorities to more comprehensively address the full range of target groups and casualty accident types.

Figure 2.
Number of Fatality-Producing Casualty Accidents and Total Number of Casualty Accidents, British Columbia, Jan. 1977-June 1986



Fatality-Producing *vs.* Injury-Only Traffic Accidents: Trends, Characteristics, Persons Involved, and Consequences. British Columbia, 1985.

Fatal traffic accidents are the most tragic and least common of all casualty-producing traffic accidents, accounting for 1.7% of these accidents in British Columbia in 1985. In addition, fatal casualty traffic accidents are the most thoroughly investigated of all traffic accidents, often incorporating coroner inquests in addition to police investigations. Arguably, much of the general conception of what constitutes a traffic accident is drawn from the picture produced by the investigation of fatal accidents. Further, it might be speculated that this in turn helps to shape the public traffic safety education and police enforcement priorities that are aimed at reducing traffic accidents.

If traffic accidents and their causes and characteristics fell into a continuum such that the more serious the accident, the more present a specific set of characteristics, and the less serious, the less present that same set, then education and enforcement could effectively reduce accidents by targetting that single set of causes and characteristics. On the other hand, if the components that go into causing a fatal accident are significantly different from those that contribute to producing an injury-only accident, then these additional factors should be incorporated into public traffic safety education and public enforcement priorities.

Consequently, it is the purpose of this paper to compare and contrast fatal casualty traffic accidents with injury-only casualty traffic accidents in order to define the central characteristics of each.

METHOD

In order to examine trends in fatality-producing and injury-only casualty accidents, police Traffic Accident Reports (MV104) were examined from 1977 to the first half of 1986, while a detailed analysis of these accidents was drawn from the 1985 MV104 casualty accident reports. As the raw data from these police reports are managed by the Motor Vehicle Department of the Ministry of Transportation and Highways, and as that Department is constantly improving their data base, any statistics produced by that Department that contradict those reported herein ought to be considered as the more accurate.

RESULTS

TRENDS AND PATTERNS:

As can be seen from Figure 1, the monthly proportion of casualty traffic accidents resulting in one or more fatalities has ranged between 1% and 3.5%, with the highest proportion occurring during the summer months. Figure 2 shows that a similar seasonal pattern exists for injury-only casualty accidents, while Table 1 shows that the yearly proportion of fatal casualty accidents appears to be gradually declining from a high of 2.7% in 1977 to a low of 1.7% during 1985 and the first half of 1986.

Figure 1.
Proportion of Casualty Accidents Resulting in Fatalities.
British Columbia, Jan. 1977-Jun. 1986

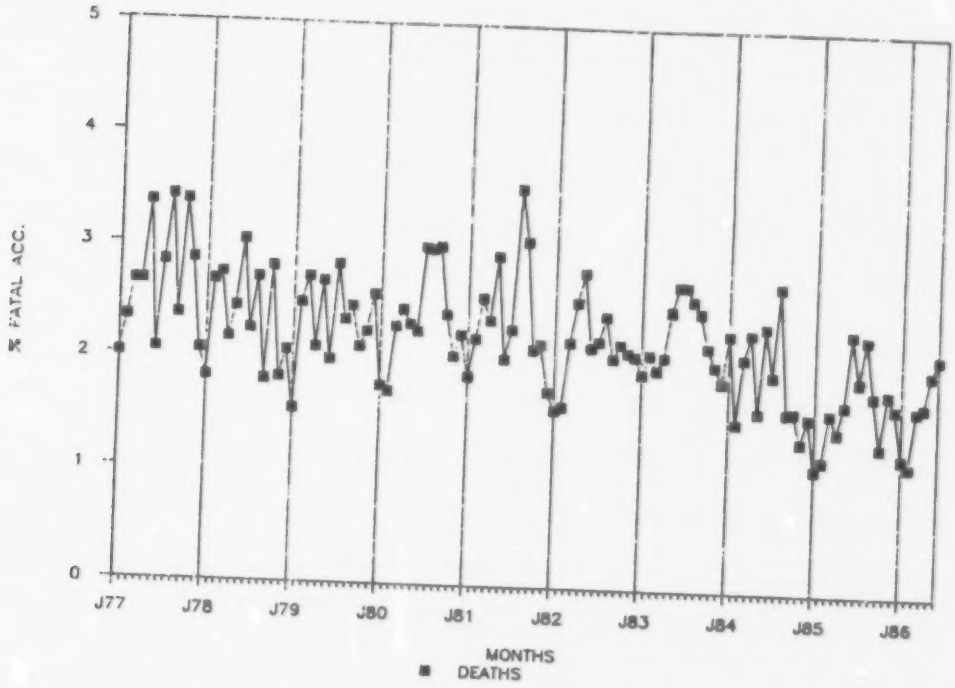


Figure 2.
Number of Fatality-Producing Casualty Accidents and Total Number of
Casualty Accidents, British Columbia, Jan. 1977-June 1986

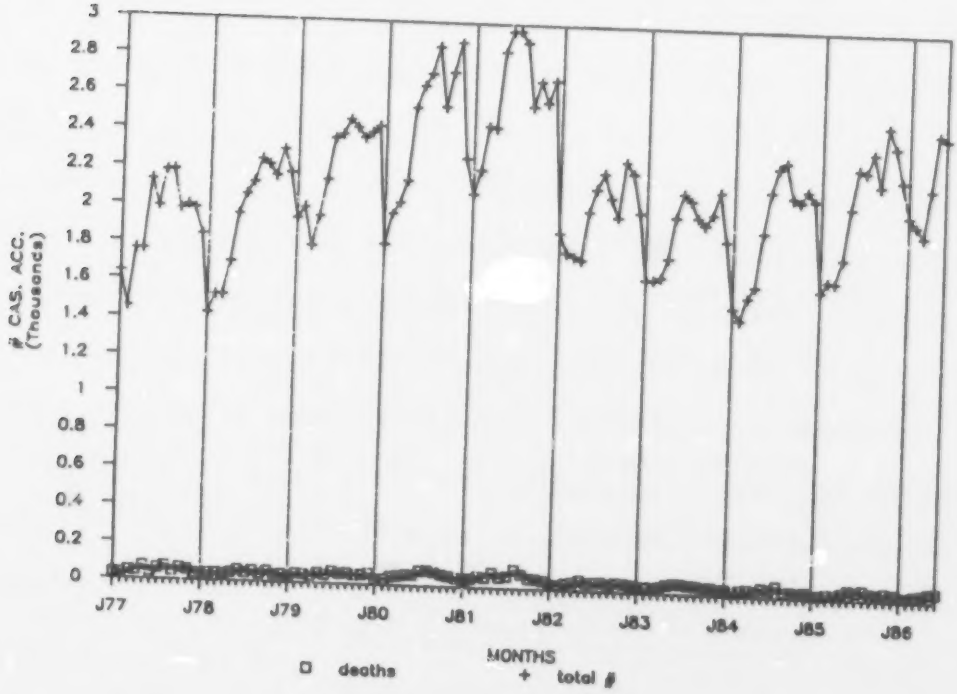


Table 1
Casualty Accident Frequencies: Year by Percentage Fatality.
British Columbia.

YEAR	TOTAL # OF CASUALTY ACCIDENTS	% FATALITY
1977	22,442	2.7%
1978	23,052	2.4%
1979	26,274	2.3%
1980	28,698	2.4%
1981	30,907	2.4%
1982	23,813	2.2%
1983	22,669	2.3%
1984	22,974	1.9%
1985	24,635	1.7%
1986 (first 6 months)	12,753	1.7%

Table 2
Percentage of Injury Only and Fatal Accidents by Police Subdivision
British Columbia, 1985.

LOCATION	Total # of Casualty Accidents	% Injury Only	% Fatality
Courtenay Municipal	450	99%	1%
Courtenay Rural	785	97%	3%
Kamloops Municipal	577	98%	2%
Kamloops Rural	830	94%	6%
Kelowna Municipal	1,008	98%	2%
Kelowna Rural	920	97%	3%
Nelson Municipal	159	97%	3%
Nelson Rural	803	96%	4%
Prince George Municipal	632	98%	2%
Prince George Rural	832	95%	5%
Prince Rupert Municipal	175	98%	2%
Prince Rupert Rural	417	95%	5%
Victoria Municipal	667	99%	1%
Victoria Rural	742	98%	2%
R.C.M.P. District 1			
Municipal	6,940	99%	1%
Rural	775	96%	4%
R.C.M.P. Freeway Patrol	584	98%	2%
Nelson Area Independents	28	96%	4%
Vancouver Area Independents	6,379	99%	1%
Victoria Area Independents	1,427	99%	1%
Other Police	12	100%	0%
British Columbia Total	25,155	98%	2%

CASUALTY ACCIDENT CHARACTERISTICS:

Time and Conditions:

From Tables 2 and 3 it can be seen that fatal accidents occurred in higher proportions in rural and agricultural (54%) areas than did injury-only accidents, which tended to occur more frequently in family/residential (29%) and business/shopping (30%) areas, while Table 4 shows that areas with higher posted speed limits produced a higher proportion of fatal accidents than did those with lower limits. To illustrate, 66% of the injury-only traffic accidents occurred in areas with a posted limit of 50 kph or lower, while 63% of the fatal accidents occurred in areas with a posted limit above 50 kph.

Fatal casualty accidents, like injury-only casualty accidents, tended to become more frequent later in the week and to peak on Fridays and Saturdays, as shown in Table 5. However, the weekend peak of accidents was more pronounced for fatal than for injury-only accidents, with 53% of the fatal and 46% of the injury-only accidents occurring during the Friday-Saturday-Sunday period.

Concerning the time of day of the accidents shown in Table 6, although both fatal and injury-only were most frequent during the evening "rush hours" of 4 p.m. to 6 p.m. (13% vs. 11%), a higher proportion of fatal accidents than of injury-only accidents occurred between midnight and 6:00 a.m. (22% vs. 11%). Table 7 further illustrates the night-time occurrence of fatal accidents: 65% of the injury-only accidents and 48% of the fatal accidents occurred in daylight, and 10% of the injury-only and

Table 3
Land Use at Casualty Accidents:
Injury Only vs. Fatality.
British Columbia 1985.

Casualty Accident	LAND USE						
	School/ Playgrnd	Family Res.	Apart-ment	Business/ Shopping	Indus-trial	Agricul-tural	Recreation Camp/Park
Injury only	3%	29%	5%	30%	6%	25%	2%
Fatality	2%	20%	2%	11%	6%	54%	5%
B.C. Total	3%	29%	5%	30%	6%	25%	3%

Table 4
Speed Zones of Casualty Accidents:
Injury Only vs. Fatality.
British Columbia 1985.

Casualty Accident	SPEED ZONE						
	0-40 kph	50 kph	60 kph	70 kph	80 kph	90 kph	100 kph
Injury only	6.0%	60.0%	13.5%	2.2%	11.3%	6.9%	0.6%
Fatality	4.2%	32.8%	12.7%	5.9%	21.6%	22.8%	0.5%
B.C. Total	5.9%	59.5%	13.5%	2.3%	11.5%	7.2%	0.6%

Table 5
Day of Week of Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	DAY OF WEEK						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Injury only	12%	14%	13%	15%	18%	16%	12%
Fatality	11%	14%	10%	12%	18%	20%	15%
B.C. Total	12%	14%	13%	15%	18%	16%	12%

Table 6
Time of day of Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	TIME OF DAY (two hour intervals)											
	Midnight 2:00 AM	2:00 AM 4:00 AM	4:00 AM 6:00 AM	6:00 AM 8:00 AM	8:00 AM 10:00 AM	10:00 AM NOON	NOON 2:00PM	2:00 PM 4:00 PM	4:00 PM 6:00 PM	6:00 PM 8:00 PM	8:00 PM 10:00 PM	10:00 PM Midnight
Injury only	5%	4%	2%	5%	8%	9%	11%	15%	15%	10%	8%	6%
Fatality	9%	8%	5%	6%	5%	8%	9%	9%	13%	11%	10%	9%
B.C. Total	5%	4%	2%	5%	8%	9%	11%	15%	15%	10%	8%	6%

Table 7
Light Conditions During Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	LIGHT CONDITION					
	Day-Light	Dawn	Dusk	Night/Full Illumination	Night/Some Illumination	Night/No Illumination
Injury only	65%	2%	4%	6%	14%	10%
Fatality	48%	4%	3%	6%	15%	24%
B.C. Total	64%	2%	4%	6%	14%	10%

Table 8
Weather Conditions During Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	WEATHER CONDITION				
	Clear	Cloudy	Raining	Snow/ Sleet	Other
Injury only	54%	24%	14%	4%	4%
Fatality	52%	30%	10%	6%	2%
B.C. Total	54%	25%	14%	4%	3%

24% of the fatal accidents occurred at night in conditions of no illumination.

Tables 8 and 9 show that both fatal and injury-only casualty accidents tended to occur in relatively good weather and dry conditions, although there was a tendency for fatal accidents to occur in better weather and in drier conditions. For example, 26% of the injury-only accidents occurred in wet weather and 14% in the rain, while the respective figures for fatal accidents was 20% and 10%.

Turning to the curve and slope of the roadway, as can be seen from Tables 10 and 11, curving roads and grades tended to be associated with fatal as opposed to injury-only casualty accidents. To illustrate, 43% of the fatal accidents and 24% of the injury-only accidents occurred on a curved portion of the road, while 49% of the fatal and 66% of the injury-only accidents occurred on a flat portion of the roadway.

Finally, Tables 12 and 13 show that a substantially higher proportion of fatal accidents occurred between intersections (64% vs. 39%) and where there were no traffic control devices (82% vs. 66%) than was the case for injury-only accidents.

Vehicles:

Fatal accidents were almost twice as likely to involve only one vehicle as were injury-only accidents (59% vs. 34%). The average number of vehicles involved in fatal accidents was 1.5, while for injury-only accidents it was 1.8.

Comparing fatal and injury-only casualty accidents in terms of collision objects, Table 14 reinforces the single-vehicle

Table 9
Road Surface Characteristics at Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	ROAD SURFACE CONDITION				
	Dry	Wet	Snow	Slush	Ice
Injury only	61%	26%	4%	2%	7%
Fatality	68%	20%	4%	2%	6%
B.C. Total	61%	26%	4%	2%	7%

Table 10
Horizontal Road Surface Characteristics at Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	HORIZONTAL ROAD CHARACTERISTICS				
	Straight	Curve	Sharp Curve	Switch-back	Winding Curves
Injury only	76.4%	15.5%	5.3%	0.6%	2.1%
Fatality	57.3%	25.6%	8.2%	1.6%	7.0%
B.C. Total	76.1%	15.7%	5.3%	0.6%	2.2%

Table 11
Vertical Road Surface Characteristics at Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	VERTICAL ROAD CHARACTERISTICS		
	Flat	Some Grade	Steep Grade
Injury only	65.8%	28.8%	5.4%
Fatality	49.4%	42.7%	7.9%
B.C. Total	65.5%	29.1%	5.4%

Table 12
Locations of Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	ACCIDENT LOCATIONS				
	Inter-section	Between intersections	"T" Junction	Bridge	Other
Injury only	44.4%	39.3%	6.0%	2.1%	8.2%
Fatality	23.8%	64.3%	2.8%	3.0%	6.1%
B.C. Total	44.1%	39.8%	6.0%	2.1%	8.0%

Table 13
Traffic Control Device at Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	TYPE OF TRAFFIC CONTROL						
	None	Stop Sign	Yield Sign	Signal Red	Signal Amber	Signal Green	Other
Injury only	66%	15%	3%	7%	2%	7%	1%
Fatality	82%	9%	4%	1%	1%	1%	2%
B.C. Total	66%	15%	3%	7%	2%	6%	1%

Table 14
Casualty Accident Collision Objects:
Injury Only vs. Fatality
British Columbia, 1985.

Casualty Accident	TYPE OF COLLISION												
			SINGLE MOTOR VEHICLE COLLISIONS										
	Other Ven.	Motor-cycle	Pedes-trian	Bike	Animal	Light Pole	Util Pole	Guard Rail	Tree	Curb	Ditch	Over turned	Other
Injury only	61%	4%	8%	7%	1%	1%	2%	1%	1%	1%	7%	2%	4%
Fatality	42%	4%	21%	4%	1%	2%	1%	2%	3%	2%	10%	5%	3%
B.C. Total	61%	4%	8%	7%	1%	1%	2%	1%	1%	1%	7%	2%	4%

Table 15
Pre-collision Action of Vehicles in Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	PRE-COLLISION ACTION											
	Going straight	Right turn	Left turn	Slowing/ Stopping	Stopped in Traffic	Legal/ Parked	Change lanes	Over-taking	Backing	Skidding	Swerving	Other
Injury only N=40,355	58%	4%	11%	4%	7%	2%	1%	1%	1%	4%	1%	7%
Fatality N=593	69%	2%	6%	1%	0%	2%	1%	2%	1%	6%	4%	6%
B.C. Total N=40,948	58%	4%	11%	4%	8%	2%	1%	1%	1%	4%	1%	5%

Table 16
Vehicle Manoeuver at Point of Impact in Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	VEHICLE MANOEUVER									
	Rear End	Head On	Side Swipe	Inter-secting at 90°	Over-taking	Right turn	Left turn	Run off road to right	Run off road to left	Other
Injury only	28%	5%	3%	23%	3%	1%	9%	16%	11%	3%
Fatality	6%	20%	6%	14%	1%	0%	3%	29%	19%	2%
B.C. Total	28%	5%	3%	23%	3%	1%	8%	16%	11%	2%

nature of fatal accidents as well as illustrating the relatively high proportion of fatal accidents involving pedestrians (21% vs. 8%). It should be noted that the "other motor vehicle" category in this table includes multiple-vehicle accidents excluding car-motorcycle accidents. The proportion of accidents involving motorcycles was 9.3% for fatal accidents and 7.5% for injury-only casualty accidents. Finally, a higher proportion of fatal accidents involved out-of-province drivers than for injury-only accidents (12.9% vs. 7.4%) and a lower proportion of fatal accidents involved commercial vehicles than for injury-only accidents (3.3% vs. 6.3%).

Pre-collision and Collision Events:

From Table 15 it can be seen that the majority of vehicles in fatal (69%) as well as injury-only (58%) casualty accidents were travelling straight ahead prior to the collision, while about twice the proportion of vehicles in injury-only accidents as in fatal accidents were turning left immediately prior to the collision (11% vs. 6%). On the other hand, Table 16 shows that, at the point of impact, vehicles in fatal and in injury-only accidents had very different collisions. To illustrate, the four most frequent point-of-impact descriptions for vehicles in injury-only accidents were "rear-end" impact (28%), "90°" impact (23%), "run off road to the right" (11%), and "run off road to the left" (11%), while for fatal accidents they were "run off road to the right" (29%), "head on" (20%), "run off road to the left (19%), and "intersect at 90°" (14%). Compared to injury-only accidents, the high proportion of "run off road" for fatal

accidents (48% vs. 27%) probably has to do with the high frequency of single-vehicle fatal accidents, as well as the high proportion of these accidents that occurred on a curved section of the roadway (43% vs. 24%).

Post-Collision and Contributing Factors:

As would be expected, fatal accidents resulted in more severe damage to vehicles than did injury-only accidents. For example, from Table 17 it can be seen that 12% of the vehicles in injury-only and 56% of those in fatal accidents were "demolished".

Hit-and-run accounted for a lower proportion of the fatal than for the injury-only accidents (1.9% vs. 4.4%).

Table 18 compares these two types of casualty accidents in terms of commonly cited contributing factors determined by the investigating police officers (as there can be more than three contributing factors per vehicle, these proportions can sum to more than 100%). The four most frequently cited contributing factors to injury-only casualty accidents were Driving Without Due Care (27%), Failure to Yield Right of Way (16%), Driving at Unsafe Speed (14%), and Alcohol (13%), while for fatal accidents they were Driving at Unsafe Speed (33%), Alcohol (30%), Driving Without Due Care (29%), and Weather (9%).

PERSONS INVOLVED:

Table 19 shows that, compared to injury-only accidents, fatal accidents involved a lower proportion of drivers (50% vs. 63%) and higher proportions of passengers (38% vs. 32%), pedestrians (6% vs. 3%), and cyclists (6% vs. 3%). It should be

Table 17
Damage Severity to Vehicles in Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	DAMAGE SEVERITY				
	No Damage	Light Damage	Moderate Damage	Severe Damage	Demolished
Injury only N=40,355	9%	29%	30%	21%	12%
Fatality N=593	5%	10%	12%	18%	56%
B.C. Total N=40,948	9%	29%	30%	21%	12%

Table 18
Contributing Factors to Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	CONTRIBUTING FACTORS						
	% Driving w/o Due Care	% Alcohol Related	% Driving at Unsafe Speed	% Fail to Yield	% Due to Weather	% Following too Closely	% Vehicle Fault
Injury only	27%	13%	14%	16%	11%	7%	4%
Fatality	29%	30%	33%	7%	9%	1%	5%
B.C. Total	27%	13%	15%	16%	11%	7%	4%

Table 19
Persons Involved in Casualty Accidents:
Injury Only vs. Fatality.
British Columbia, 1985.

Casualty Accident	PERSONS INVOLVED			
	Drivers	Passengers	Pedestrians	Cyclists
Injury only N=63,800	62.5%	31.6%	3.0%	2.9%
Fatality N=1,286	50.3%	38.0%	6.0%	5.6%
B.C. Total N=65,086	62.3%	31.7%	3.1%	2.9%

noted that these figures represent those involved who were injured as well as those who escaped injury.

Drivers and Passengers:

From Table 20 it can be seen that drivers in fatal accidents were, on the average, slightly older than those in injury-only accidents (36 yrs. vs. 34 yrs.), and that for injury-only but not fatal accidents, younger drivers were more likely to carry passengers. Further, compared to vehicles in injury-only accidents, vehicles in fatal accidents had a higher proportion of male drivers (80% vs. 69%) and there was a higher average number of passengers in those vehicles carrying passengers (1.4 vs. 1.3). However, half of the vehicles in fatal accidents and 63% of those in injury-only accidents carried no passengers. For both accident types, passengers were on an average younger than their drivers, and the male passengers averaged younger than the female passengers. However, there was less of a difference between average passenger-carrying driver's age and the average passenger's age in fatal (7 years) than in injury-only (9 years) accidents. In addition, it can be seen that a higher proportion of vehicles in fatal accidents carried male passengers than did those in injury-only accidents (34% vs. 20%). Further a higher proportion of vehicles in fatal accidents carried male as opposed to female passengers (34% vs. 26%). On the other hand, in vehicles in injury-only accidents, there was a slightly higher proportion with female than male passengers (22% vs. 20%). Finally, these police reports indicated that occupants in fatal accidents exhibited a lower restraint device use rate than did those in injury-only accidents (57% vs. 88%).

Table 20
Characteristics of Persons in Vehicles:
Injury Only vs. Fatality.
British Columbia, 1985.

VARIABLE	INJURY ONLY CASUALTY ACCIDENT	FATALITY CASUALTY ACCIDENT	B.C. TOTAL
Average Driver's Age	33.7 yr.	36.0 yr.	33.8 yr.
Average Driver's Age/veh. carrying passengers	33.1 yr.	35.7 yr.	33.2 yr.
Average Driver's Age/veh. carrying no passengers	35.0 yr.	35.4 yr.	35.0 yr.
% Male Drivers	68.7%	80.4%	68.8%
Average # Passengers in veh. carrying passengers	1.3	1.4	1.3
Ave. # Male Passengers in veh. carrying passengers	1.3	1.5	1.3
Ave. # Female Passengers veh. carrying passengers	1.3	1.4	1.3
Average Passenger's age	23.7 yr.	29.0 yr.	23.8 yr.
Average Male Passenger's age	21.2 yr.	26.2 yr.	21.2 yr.
Average Female Passenger's age	26.8 yr.	33.0 yr.	27.0 yr.
% Vehicles with Passengers	36.5%	49.8%	36.7%
% Vehicles with Male Passengers	19.7%	34.2%	19.9%
% Vehicles with Female Passengers	22.0%	26.1%	22.0%
% Occupant Seat Belt use	88.1%	57.4%	87.5%

Comparing male and female drivers in injury-only accidents, Table 21 and Figure 3 show that there were very few differences between the two, with the exception that male drivers tended to carry a higher proportion of male passengers and female drivers tended to carry a higher proportion of female passengers. From Table 21 and Figure 4 it can be seen that, compared to female drivers in fatal accidents, male drivers in fatal accidents were on an average 4 years younger (35 yrs. vs. 39 yrs.). Additionally, vehicles in fatal accidents that carried passengers and were driven by male drivers carried on an average fewer passengers (1.4 vs. 1.5), carried more male passengers (1.5 vs. 1.3) and fewer female passengers (1.4 vs. 1.6). Finally, the occupants of vehicles in fatal accidents driven by male drivers showed a lower restraint device use rate than did those in vehicles in fatal accidents driven by female drivers (54% vs. 73%).

Table 22 divides both male and female drivers into two age categories - 33 years and younger and 34 years and older - using the average driver age for casualty accidents in B.C. in 1985. As can be seen, drivers in fatal accidents tended to carry passengers more frequently than did those in injury-only accidents, and with the exception of female drivers in fatal accidents, older drivers carried passengers less than did younger drivers. For the female drivers in fatal accidents, both the older and younger drivers carried passengers at about the same frequency.

Tables 23 and 24 examine, for both male and female drivers, the gender of passengers carried in vehicles in fatal and injury-

Table 21
Characteristics of Persons in Vehicles:
Injury Only vs. Fatal Casualty Accidents
Comparison of Male and Female Drivers.
British Columbia, 1985.

	MALE DRIVERS			FEMALE DRIVERS		
VARIABLE	Injury only N=27656	Fatality N=536	B.C. Total N=28192	Injury only N=12249	Fatality N=112	B.C. Total N=12361
Average Driver's Age	33.5 yr.	35.4 yr.	33.6 yr	34.1 yr.	38.9 yr.	34.2 yr
Average Driver's Age/veh. carrying passengers	33.3 yr.	35.0 yr.	33.4 yr	32.5 yr.	39.2 yr.	32.6 yr
Average Driver's Age/veh. carrying no passengers	34.7 yr.	35.1 yr.	34.7 yr	35.8 yr.	37.4 yr.	35.8 yr
% Male Drivers	69.7%	80.0%	69.8%	66.3%	82.4%	66.4%
Average # Passengers in veh. carrying passengers	1.3	1.4	1.3	1.3	1.5	1.3
Ave. # Male Passengers in veh. carrying passengers	1.3	1.5	1.3	1.3	1.3	1.3
Ave. # Female Passengers veh. carrying passengers	1.3	1.4	1.3	1.3	1.6	1.3
Average Passenger's age	24.7 yr.	27.2 yr.	24.7 yr	21.5 yr.	37.5 yr.	21.7 yr
Average Male Passenger's age	21.4 yr.	24.5 yr.	21.4 yr	20.7 yr.	34.5 yr.	20.9 yr
Average Female Passenger's age	28.6 yr.	31.7 yr.	28.7 yr	22.8 yr.	39.4 yr.	23.1 yr
% Vehicles with Passengers	37.0%	48.5%	37.2%	35.3%	56.2%	35.5%
% Vehicles with Male Passengers	20.7%	34.5%	20.9%	17.5%	32.6%	17.6%
% Vehicles with Female Passengers	21.4%	22.4%	21.4%	23.2%	43.8%	23.4%
% Occupant Seat Belt use	86.4%	54.2%	85.7%	91.8%	72.8%	91.6%

Figure 3

Male and Female Drivers' Age: Injury-Only Casualty Accidents
British Columbia, 1985.

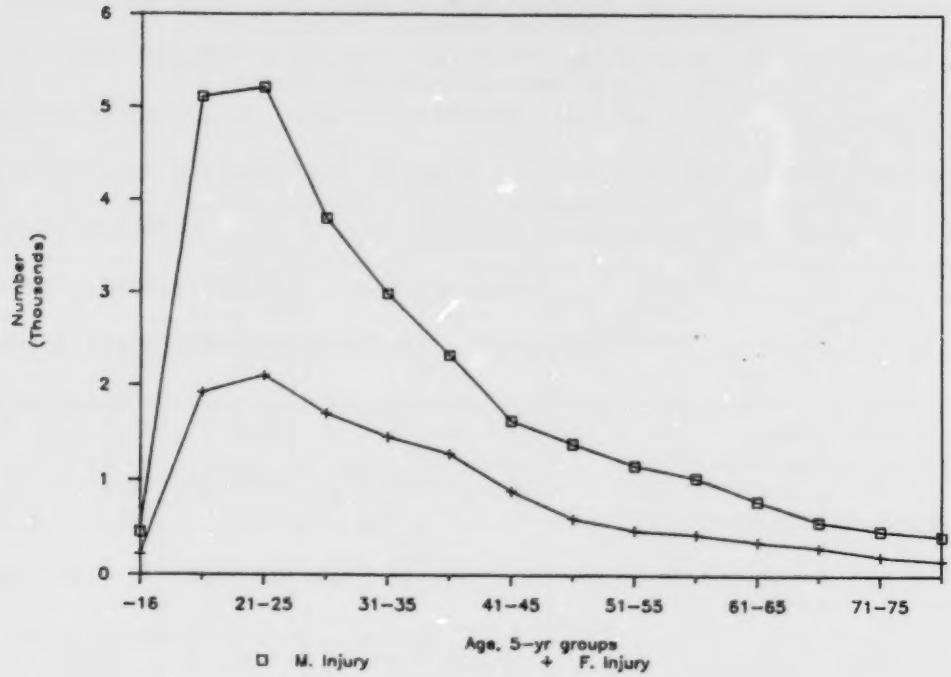


Figure 4

Male and Female Drivers' Age: Fatality-Producing Casualty Accidents
British Columbia, 1985

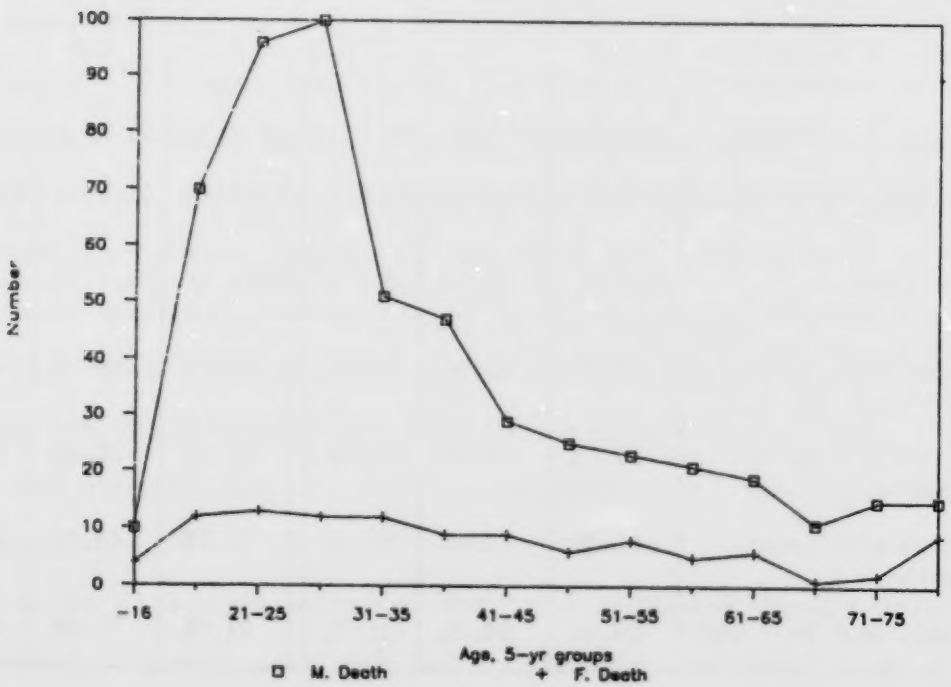


Table 22
Driver Gender and Age by Number of Passengers in Vehicle:
Injury Only vs. Fatality.
British Columbia, 1985.

Number of Passengers	INJURY ONLY				FATAL			
	Male Driver		Female Driver		Male Driver		Female Driver	
	-34 years N=14,897	34+ years N=10,279	-34 years N=6,058	34+ years N=4,849	-34 years N=280	34+ years N=194	-34 years N=42	34+ years N=47
0	60.6%	65.6%	61.2%	68.4%	49.6%	55.2%	45.2%	42.6%
1	26.4%	25.0%	24.7%	21.2%	28.9%	31.4%	21.4%	25.5%
2	7.8%	5.0%	9.3%	6.7%	11.4%	6.7%	16.7%	19.1%
3+	5.2%	4.4%	4.9%	3.7%	10.0%	6.7%	16.7%	12.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 23
Driver Gender and Age by Number of Male Passengers in Vehicle:
Injury Only vs. Fatality.
British Columbia, 1985.

Number of Passengers	INJURY ONLY				FATAL			
	Male Driver		Female Driver		Male Driver		Female Driver	
	-34 years N=14,897	34+ years N=10,279	-34 years N=6,058	34+ years N=4,849	-34 years N=280	34+ years N=194	-34 years N=42	34+ years N=47
0	74.2%	86.2%	80.0%	85.3%	58.6%	76.3%	66.7%	68.1%
1	19.4%	11.1%	15.2%	12.0%	26.8%	18.6%	19.0%	27.7%
2	4.7%	1.9%	3.7%	2.0%	9.3%	3.1%	11.9%	4.3%
3+	1.7%	0.7%	1.0%	0.7%	5.4%	2.1%	2.4%	0.0%
Total	100%	100%	100%	100%	100%	100%	100%	100%

Table 24
Driver Gender and Age by Number of Female Passengers in Vehicle:
Injury Only vs. Fatality.
British Columbia, 1985.

Number of Passengers	INJURY ONLY				FATAL			
	Male Driver		Female Driver		Male Driver		Female Driver	
	-34 years N=14,897	34+ years N=10,279	-34 years N=6,058	34+ years N=4,849	-34 years N=280	34+ years N=194	-34 years N=42	34+ years N=47
0	80.8%	74.7%	74.8%	78.7%	81.8%	71.6%	59.5%	53.2%
1	14.7%	20.2%	18.9%	16.3%	12.5%	21.6%	26.2%	29.8%
2	3.5%	3.7%	4.9%	3.8%	3.6%	6.2%	9.5%	8.5%
3+	1.0%	1.4%	1.3%	1.2%	2.1%	0.5%	4.8%	8.5%
Total	100%	100%	100%	100%	100%	100%	100%	100%

only casualty accidents. Comparing these two tables, it would appear that younger male drivers carried a higher proportion of male passengers and lower proportion of female passengers than did older male drivers for both those involved in injury-only and fatal accidents. For example, 41% of the male drivers under 34 years of age who were involved in fatal accidents carried one or more male passengers and only 19% carried one or more female passengers, while the respective figures for male drivers over 34 years of age in fatal accidents was 24% (one or more male passengers) and 28% (one or more female passengers). On the other hand, while female drivers in fatal accidents were more likely to carry passengers more often than those in injury-only accidents, and were more likely to carry female than male passengers, compared to male drivers there was less of a difference between older and younger female drivers in terms of the frequency of carrying passengers. For example, 33% of the female drivers under 34 years of age who were involved in fatal accidents carried one or more male passengers and 40% carried one or more female passengers, while the respective figures for those female drivers 34 years or older in fatal accidents was 32% (one or more male passengers) and 47% (one or more female passengers).

PERSONS INJURED:

On an average, in 1985 in B.C. fatal accidents injured 1.1 persons per accident and killed 1.1 persons per accident for a total of 457 persons injured and 483 persons killed, while injury-only accidents injured on an average 1.4 persons for a total of 33,893 persons injured. The average age of males who

Figure 5.
Male and Female Victims' Ages: Fatality-Producing Casualty Accidents.
British Columbia, 1985

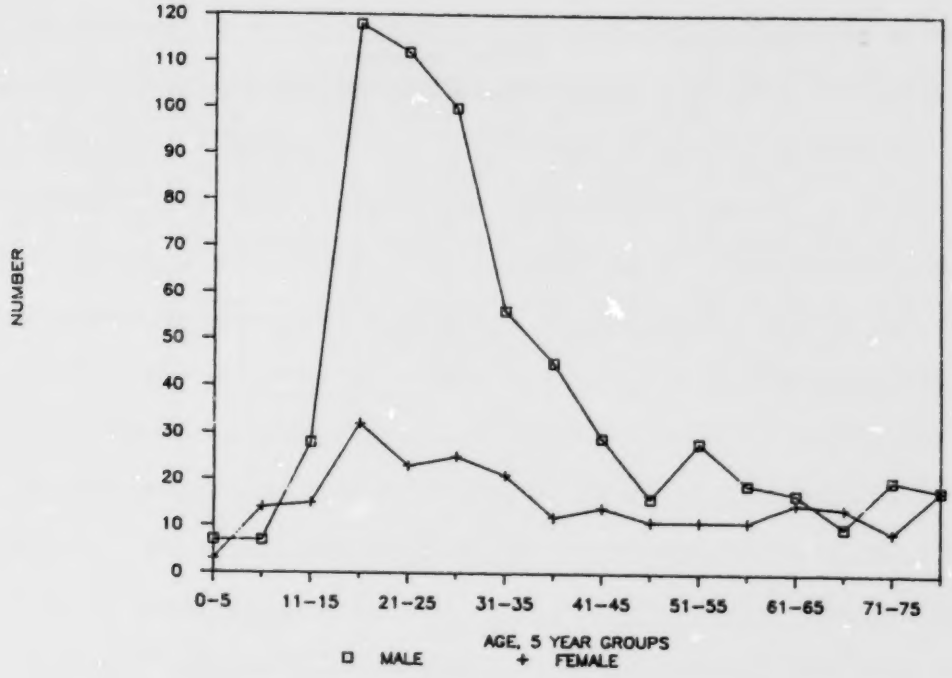


Figure 6.
Male and Female Victims' Ages: Injury-Only Casualty Accidents
British Columbia, 1985

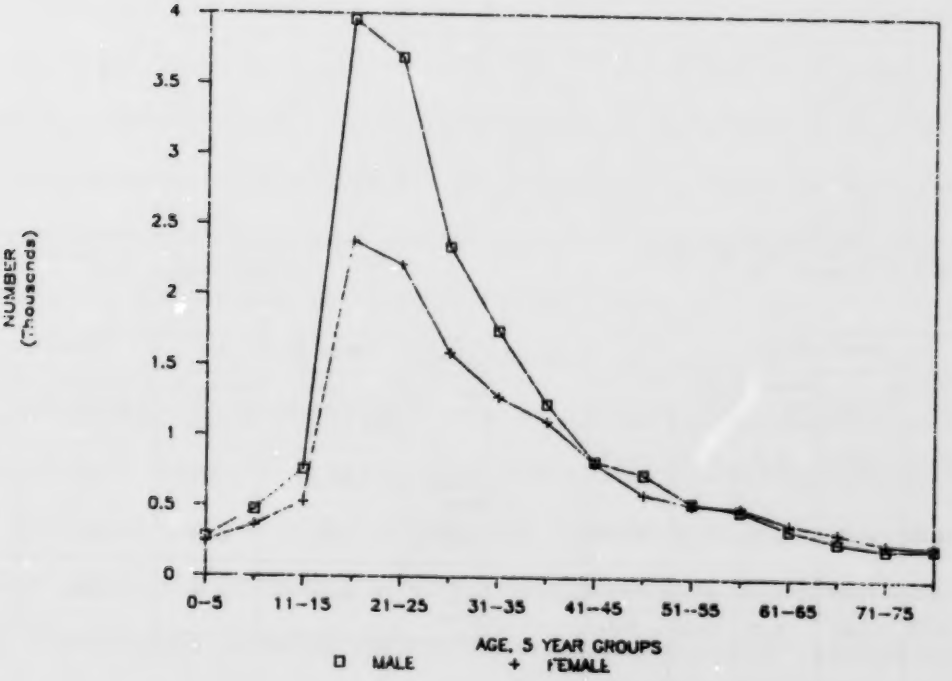


Table 25
Victim's State of Consciousness:
Injury Only vs. Fatal Casualty Accidents.
British Columbia, 1985.

Casualty Accident	STATE OF CONSCIOUSNESS					
	Appears Normal	Agitated	Incoherent	Semi-conscious	Unconscious	Appears Dead
Injury only N=32,865	78%	15.7%	1.9%	3.4%	1.0%	0%
Fatality N=904	19.5%	14.2%	2.2%	8.5%	2.4%	53.2%
B.C. Total N=33,769	76.4%	15.7%	1.9%	3.5%	1.0%	1.4%

Table 26
Victims' Injury Type:
Injury Only vs. Fatality Casualty Accidents.
British Columbia, 1985.

Casualty Accident	INJURY TYPE							
	Abrasion	Bruise	Laceration	Bleeding	Fracture	Dislocation	Concussion	Whiplash
Injury only N=28,238	13.2%	49.9%	14.5%	7.6%	8.0%	3.8%	2.6%	3.9%
Fatality N=827	5.1%	16.3%	15.4%	16.0%	35.4%	2.7%	4.8%	0.0%
B.C. Total N=29,065	13.0%	48.9%	14.5%	7.9%	8.8%	3.8%	2.7%	3.8%

Table 27
Victims' Injury Location:
Injury Only vs. Fatality Casualty Accidents.
British Columbia, 1985.

Casualty Accident	INJURY LOCATION					
	Head/ Neck	Chest/ Back	Arm/ Shoulder	Abdomen/ Hip	Lower Leg	All Body
Injury only N=32,978	53.0%	13.7%	12.9%	6.2%	12.0%	2.2%
Fatality N=884	46.4%	15.0%	6.7%	6.3%	5.1%	20.5%
B.C. Total N=33,862	52.8%	13.7%	12.8%	6.2%	11.8%	2.7%

Table 28
Motor Vehicle Act and Criminal Code Charges Laid:
Injury Only vs. Fatal Casualty Accidents.
British Columbia, 1985.

Casualty Accident	Motor Vehicle Act		Criminal Code	
	% Accidents where charges were laid	Average # Charges/ Accident	% Accidents where charges were laid	Average # Charges/ Accident
Injury only	39.6%	0.46	5.6%	0.10
Fatality	7.2%	0.09	8.4%	0.17
B.C. Total	39.1%	0.45	5.6%	0.10

were injured or killed in fatal accidents was 33.0 yrs. and for females it was 38.8 yrs. The average age of males who were injured in injury-only accidents was 30.0 yrs. and for females it was 33.0 yrs. Figures 5 and 6 show the high frequency of involvement of males between the ages of 16 and 30 in both fatal and injury-only accidents, and of females in that age group in injury-only accidents.

Tables 25, 26, and 27 compare states of consciousness, injury types and injury locations between those injured in injury-only accidents and those injured or killed in fatal accidents. It should be noted that these assessments refer to the most serious injury to the person and were determined by the investigating officer, as opposed to by a physician.

CHARGES LAID:

Table 28 shows that a substantially higher proportion of Motor Vehicle Act charges (e.g. Speeding, Failure to Yield Right of Way) were laid in injury-only accidents than in fatal accidents (40% vs. 7%), but that a higher proportion of Criminal Code charges (e.g. Driving While Impaired, Dangerous Driving) were laid in fatal accidents (8% vs. 6%). However, in the majority of accidents no charges were laid.

CONCLUSIONS

To summarize, the proportion of fatality-producing to injury-only casualty traffic accidents has gradually declined over the past 10 years to a 1985-86 level of 1.7%, with the highest seasonal proportion occurring during the summer months. While the charge history of drivers in injury-only accidents is

similar to that of drivers in fatal accidents (Mercer, 1986), accident characteristics and other driver characteristics differ between the typical fatal and typical injury-only traffic accident.

From these analyses the typical fatal accident in B.C. in 1985 occurred on a rural, high-speed road in the dark on a weekend. It most likely involved a single vehicle that either failed to negotiate a curve, or simply ran off the side of a straight road while if a second vehicle was involved there was often a head-on collision. The most frequent contributing factors to the accident were excessive speed and/or alcohol.

Drivers in fatal accidents were most frequently male (80%). About 45% of the male drivers 34 years of age or older carried passengers, and the passengers were slightly more likely to be male than female, while half of the younger male drivers carried passengers and the passengers were much more likely to be male than female. On the other hand, about 56% of both younger and older female drivers in fatal accidents carried passengers, and the passengers were much more likely to be female than male. Further, occupants of vehicles driven by males were less likely to wear restraint devices than were occupants in vehicles driven by females. Finally, the average age of male victims in fatal accidents was 33 years and female victims was 39 years.

In contrast, a typical injury-only accident occurred on an urban, 50 kph road in the daylight during the evening "rush hours". It most likely involved one vehicle which rear-ended or struck another vehicle at 90° at an intersection. The most

frequent contributing factors were driving without due care and/or failure to yield the right of way.

There was a higher proportion of female drivers in injury-only accidents than in fatal accidents, although the majority of drivers in injury-only accidents (70%) were male. Overall, drivers in injury-only accidents were less likely to carry passengers than were drivers in fatal accidents. A third of the male drivers 34 years of age or older carried passengers and the passengers were slightly more likely to male than female, while 39% of the younger male drivers carried passengers and the passengers were appreciably more likely to be male. On the other hand, while fewer of the older female drivers carried passengers than did the younger female drivers, in all cases the passengers were more likely to be female than male. Restraint device use rates were similar for occupants of vehicles driven by males as for vehicles driven by females. Finally, the average victim age for both males and females in these injury-only accidents was less than for victims of fatal accidents, with an average male victim age of 30 years and an average female victim age of 33 years.

Admittedly, every traffic accident is unique, and within both the fatal and injury-only categories there are a number of subsets that have not been addressed (e.g. pedestrian, commercial vehicle, motorcycle). However, in order to design counter-measures and identify target groups, accident types need to be characterized. Indeed, the young male drinking driver in a high-speed, night-time, single-vehicle crash is a well-recognized

central figure in fatal accidents. However, when injury-only casualty accidents are contrasted with fatal accidents, other important and exponentially more common accident configurations emerge. For example, the female driver becomes a very significant factor, accounting for almost a third of the drivers in injury-only accidents, while the older male driver with no passengers going through intersections during "rush hours" also gains in importance. Also of central importance in injury-only accidents are the contributing factors of carelessness and failure to yield, and the daytime and during the week as accident times.

It follows that to further reduce traffic accident frequencies, educators and policy-makers might expand public education programs and police enforcement priorities to more comprehensively address the full range of target groups and casualty accident types.

REFERENCES

Mercer, G. W. Frequency, types and patterns of traffic convictions and frequency and type of traffic accidents. Ministry of Attorney General, Vancouver, British Columbia, 1986.

Intersection Casualty Accidents: Trends, Characteristics, Persons Involved, and Consequences British Columbia, 1985.

SUMMARY

To summarize, 42% to 46% of all casualty accidents in B.C. occurred where one road crossed another, with the highest number and lowest proportion occurring during the summer months. They happened most frequently in business and shopping areas, especially during the evening "rush hours". They tended to occur in daylight or in good artificial lighting and primarily in good weather, although about a third occurred in wet conditions.

Turning to the traffic control devices at the accident scene, a third of the casualty intersection accidents occurred where there were no traffic signs or signals, a third where there were stop signs, and a third where there were stop lights. Of the latter, 45% occurred on a red light, 45% on a green light, and 10% on an amber light. It is noteworthy that, contrary perhaps to the popular impression, only 3% of all intersection casualty accidents occurred on an amber light and 14% on a red light, leaving 83% not associated with automatic traffic signal violations.

Over 80% of these intersection casualty accidents were multiple-vehicle accidents, with only 9% involving pedestrians and 8% involving bicycles. In 43% of the instances one vehicle struck the other at a 90° angle, while 28% involved rear-end collisions. The causes included Failure to Yield the Right of Way (29%), Driving Without Due Care (25%), Unsafe Speed (10%) and Alcohol (9%).

Comparing intersection casualty accidents to non-intersection casualty accidents, the drivers in intersection accidents were older (average age 35 years), carried fewer passengers (65% carried no passengers), and reported a higher frequency of restraint device use. While 67% of the drivers in these accidents were male, half of all male drivers and over half of all female drivers who had casualty traffic accidents in 1985 had them at intersections. The male drivers in these accidents reported lower restraint device use in their vehicles and carried older passengers than did the female drivers. Overall, intersection casualty accidents produced a lower proportion of fatalities and less severe injuries than did non-intersection casualty accidents.

In terms of countermeasures, high-visibility police enforcement campaigns at controlled intersections has shown promise as a way to reduce, at least for the duration of the campaign, driving behaviours that could lead to traffic accidents (Mercer, 1986). However, as two-thirds of intersection accidents occurred at intersections with no traffic signs or signals, or at intersections with only stop signs, and as these sorts of intersections are far too numerous to be included in targetted intersection enforcement campaigns, it follows that driver education dealing

with right-of-way and driver courtesy may help to reduce these accidents. Further, as a high proportion of intersection casualty accidents involve rear-end collisions, driver education on following distances might be considered.

The target groups for such education materials ought to focus on adult drivers carrying no passengers who are on the road during "rush hours", and on adult female drivers carrying young passengers. Themes that could prove useful might include the notion of not carrying the day's work stress over into the task of driving home, of responsibility to those waiting at home, and, especially for the female driver, responsibility for her young passengers.

Finally, unlike the speed-and-alcohol traffic accidents that tend not to occur at intersections, intersection casualty accidents appear to be less of a product of "lifestyle" and more of a product of inattention, discourtesy, and perhaps ignorance of the basic rules of the road. Consequently, with a combination of public education and police enforcement programs, there is reason to hope that these accidents could be successfully reduced.

Intersection Casualty Accidents: Trends, Characteristics, Persons Involved, and Consequences. British Columbia, 1985.

Traffic accidents where one road crosses another make up almost half of all traffic accidents that produce injury or death in British Columbia. In urban areas intersection casualty accidents comprise over half of all casualty accidents (Mercer, 1984). In order to devise countermeasures aimed at reducing these accidents, it is necessary to know the characteristics of the accidents and of the drivers involved. Consequently, it is the purpose of this paper to examine intersection casualty accidents in British Columbia in terms of their trends and patterns, time and conditions, vehicles involved, pre-collision and collision events, post-collision events and contributing factors, drivers, passengers, victims, and charges laid in the hope of providing information that could be applied to reducing these accidents.

METHOD

In order to examine trends in intersection casualty accidents (i.e. an accident where one or more persons were injured or killed), police traffic Accident Reports (MV104) were examined from 1977 to the first half of 1986, while a detailed analysis of these accidents was drawn from the 1985 MV104 casualty accident reports. As the raw data from these police reports are managed by the Motor Vehicle Department of the Ministry of Transportation and Highways, and as that Department

is constantly improving their data base, any statistics produced by that Department that contradict those reported herein ought to be considered as the more accurate.

For the purpose of this paper, "intersection" is defined as the place where two roads cross each other, as opposed to a "T" junction.

RESULTS

TRENDS AND PATTERNS:

As can be see from Table 1 and Figures 1 and 2, the proportion of casualty traffic accidents occurring at intersections has remained relatively constant over the period between 1977 and the first six months of 1986, although there appears to be a possible increasing proportional trend from the 42% level that held between 1977-1982 to the 46% level in early 1986. Seasonally, while the absolute number of intersection casualty accidents increases in the summer, the proportion decreases. Further, the proportion of these accidents appears to increase in the spring and fall, and to decrease sharply in the December-January period.

CASUALTY ACCIDENT CHARACTERISTICS:

Time and Conditions:

As can be seen from Tables 2 and 3, intersection casualty accidents tended to occur in high proportions in municipal areas, in business/shopping (41%), and residential (35%) areas. Table 4 shows that, like non-intersection casualty accidents, intersection casualty accidents tended to peak towards the end of the week. However, the weekend increase for intersection casualty

Table 1
Casualty Accident Frequencies:
Year by Percentage at Intersections.
British Columbia.

YEAR	TOTAL # OF CASUALTY ACCIDENTS	% AT INTERSECTION
1977	22,442	41.5%
1978	23,052	42.3%
1979	26,274	42.1%
1980	28,698	42.3%
1981	30,907	42.4%
1982	23,813	41.9%
1983	22,669	43.0%
1984	22,974	44.1%
1985	24,635	45.0%
1986 (first 6 months)	12,753	45.7%

Table 2
Percentage of Intersection Casualty Accidents by Police Subdivision
British Columbia, 1985.

L O C A T I O N	Total # of Casualty Accidents	% Intersection Accident
Courtenay Municipal	441	50%
Courtenay Rural	727	23%
Kamloops Municipal	565	52%
Kamloops Rural	794	11%
Kelowna Municipal	986	54%
Kelowna Rural	886	21%
Nelson Municipal	158	52%
Nelson Rural	772	18%
Prince George Municipal	621	54%
Prince George Rural	804	19%
Prince Rupert Municipal	174	50%
Prince Rupert Rural	405	14%
Victoria Municipal	658	51%
Victoria Rural	715	32%
R.C.M.P. District 1		
Municipal	6,875	54%
Rural	743	23%
R.C.M.P. Freeway Patrol	569	8%
Nelson Area Independents	27	63%
Vancouver Area Independents	6,276	56%
Victoria Area Independents	1,416	55%
Other Police	10	20%
British Columbia Total	24,622	45%

FIGURE 1
PERCENT OF CASUALTY ACCIDENTS OCCURRING AT INTERSECTIONS.
BRITISH COLUMBIA, JAN. 1977-JUNE 1986.

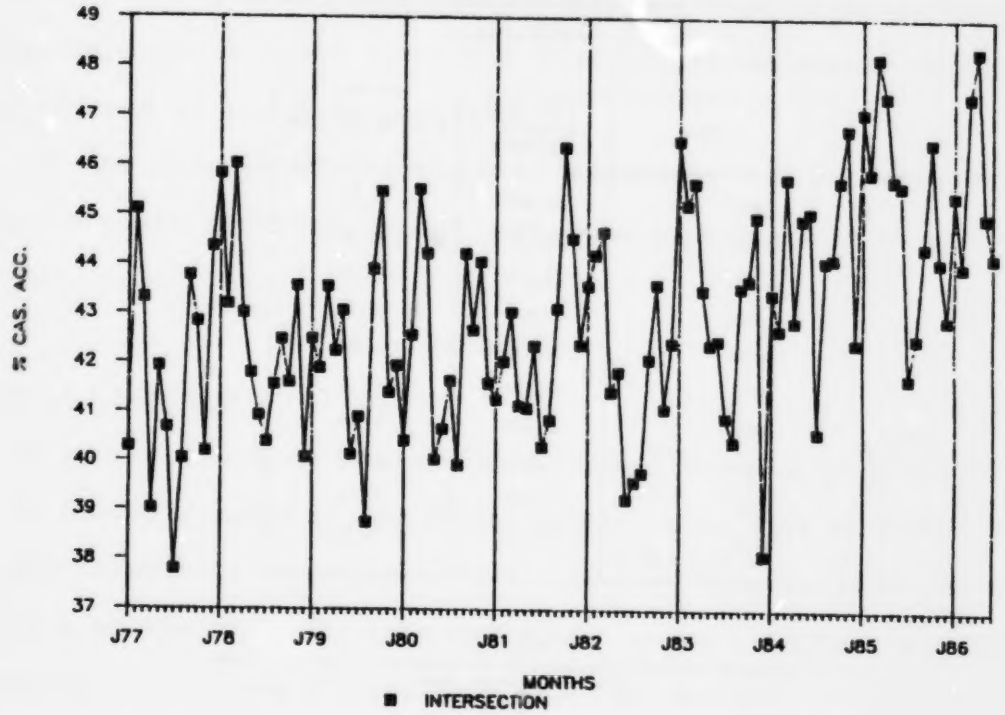


FIGURE 2
NUMBER OF INTERSECTION AND TOTAL NUMBER OF CASUALTY ACCIDENTS.
BRITISH COLUMBIA, JAN. 1977-JUNE 1986.

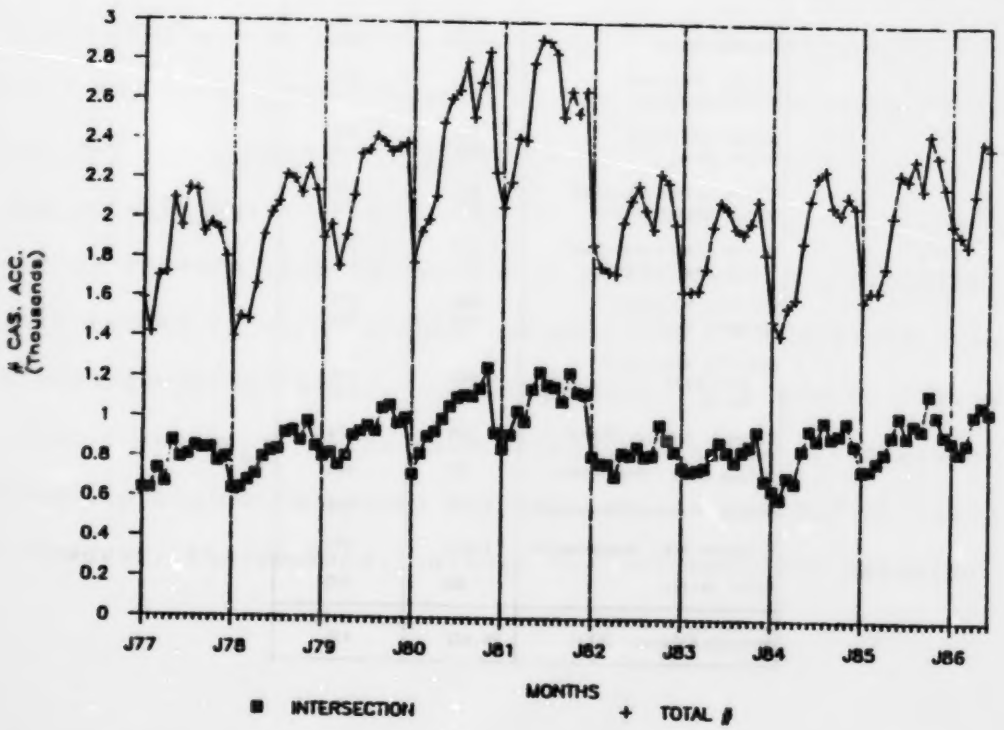


Table 3
Land Use at Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia 1985.

Inter-section Accid.	LAND USE						
	School/ Playgrnd	Family Res.	Apart-ment	Business/ Shopping	Indus-trial	Agricul-tural	Recreation Camp/Park
No	2%	25%	4%	22%	7%	37%	4%
Yes	3%	35%	6%	41%	5%	9%	1%
B.C. Total	3%	29%	5%	30%	6%	25%	2%

Table 4
Day of Week of Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Inter-section Accident	DAY OF WEEK						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
No	12%	14%	12%	14%	17%	18%	14%
Yes	13%	14%	14%	16%	18%	15%	11%
B.C. Total	12%	14%	13%	15%	18%	16%	12%

Table 5
Time of day of Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Inter-section Accident	TIME OF DAY (two hour intervals)											
	Midnight 2:00 AM	2:00 AM 4:00 AM	4:00 AM 6:00 AM	6:00 AM 8:00 AM	8:00 AM 10:00 AM	10:00 AM NOON	NOON 2:00PM	2:00 PM 4:00 PM	4:00 PM 6:00 PM	6:00 PM 8:00 PM	8:00 PM 10:00 PM	10:00 PM Midnight
No	6%	5%	3%	6%	8%	8%	10%	13%	14%	10%	8%	7%
Yes	4%	3%	1%	5%	9%	10%	13%	16%	17%	11%	8%	5%
B.C. Total	5%	4%	2%	5%	8%	9%	11%	15%	15%	10%	8%	7%

accidents was less than for non-intersection accidents, while the proportion of intersection accidents occurring on weekdays was higher than the proportion of non-intersection accidents occurring on weekdays. Similarly, Table 5 shows that, like non-intersection casualty accidents, intersection casualty accidents occurred most frequently between 10:00 a.m. and 8:00 p.m., and in particular during the evening "rush hours".

Turning to the accident environment, Table 6 shows that intersection casualty accidents were more likely than non-intersection casualty accidents to have occurred in daylight (70% vs. 60%) or in artificial illumination (23% vs. 18%). Tables 7 and 8 show that, while overall most intersection and non-intersection accidents occurred in relatively good weather (78% vs. 80%) and on dry roads (62% vs. 60%), intersection casualty accidents tended to occur more in wet (30% vs. 23%) conditions. Finally, Table 9 shows that intersection casualty accidents occurred where there was a stop sign (32%), where there were no traffic control devices (32%), and where there was a red (14%) or equally where there was a green (14%) signal, while the vast majority (93%) of non-intersection casualty accidents occurred where there were no traffic control devices.

Vehicles:

Non-intersection casualty accidents were more than twice as likely to involve only one vehicle (48.2%) than were intersection casualty accidents (16.1%). The average number of vehicles involved in an intersection casualty accident was 1.9, while for a non-intersection casualty accident it was 1.6. On the other

Table 6
Light Conditions During Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	LIGHT CONDITION					
	Daylight	Dawn	Dusk	Night/Full Illumination	Night/Some Illumination	Night/No Illumination
No	60%	2%	4%	5%	13%	16%
Yes	70%	1%	4%	8%	15%	3%
B.C. Total	64%	2%	4%	6%	14%	10%

Table 7
Weather Conditions During Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	WEATHER CONDITION				
	Clear	Cloudy	Raining	Snow/Sleet	Other
No	55%	25%	12%	5%	3%
Yes	54%	24%	16%	3%	3%
B.C. Total	54%	25%	14%	4%	3%

Table 8
Road Surface Characteristics at Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	ROAD SURFACE CONDITION				
	Dry	Wet	Snow	Slush	Ice
No	60%	23%	5%	2%	10%
Yes	62%	30%	3%	1%	4%
B.C. Total	61%	26%	4%	2%	7%

Table 9
Traffic Control Device at Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	TYPE OF TRAFFIC CONTROL						
	None	Stop Sign	Yield Sign	Signal Red	Signal Amber	Signal Green	Other
No	93%	1%	3%	1%	0%	1%	2%
Yes	32%	32%	3%	14%	3%	14%	2%
B.C. Total	66%	15%	3%	7%	2%	7%	2%

hand, the proportions of casualty accidents between a motor vehicle and a motorcycle, pedestrian, or cyclist were very similar between intersection and non-intersection accidents, as can be seen from Table 10. It should be noted that the "other motor vehicle" category in Table 10 includes multiple-vehicle accidents excluding car-motorcycle accidents. The proportion of casualty accidents involving any motorcycles for intersection locations was 7.2% and for non-intersection locations was 8.0%. Finally, commercial vehicle casualty accidents occurred less frequently at intersections (4% vs. 6%), as did casualty accidents involving out-of-province vehicles (6% vs. 8%).

Pre-collision and Collision Events:

Table 11 shows that prior to the collision 58% of the vehicles in non-intersection casualty accidents and 59% of the vehicles in intersection casualty accidents were going straight ahead. The largest difference in pre-collision activity occurred in the "left turn" category, which contained 5% of the vehicles in non-intersection and 18% of the vehicles in intersection casualty accidents. Table 12 shows that the point of impact in intersection casualty accidents was predominantly at a 90° angle (43%) followed by "rear end" (28%) while for non-intersection casualty accidents the impact occurred at the rear end (28%) followed by running off the road to the right (26%) and to the left (18%). It should be noted that running off to the left would generally involve crossing one or more lanes of traffic.

Table 10
Casualty Accident Collision Types:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accid.	TYPE OF COLLISION												
			SINGLE MOTOR VEHICLE COLLISIONS										
	Other Veh.	Motorcycle	Pedestrian	Bike	Animal	Light Pole	Util Pole	Guard Rail	Tree	Curb	Ditch	Over turned	Other
No	50%	3%	8%	6%	2%	2%	3%	1%	2%	2%	12%	3%	6%
Yes	73%	5%	9%	8%	0%	1%	1%	0%	0%	1%	2%	1%	0%
B.C. Total	61%	4%	8%	7%	1%	1%	2%	1%	1%	1%	7%	2%	4%

Table 11
Pre-collision Action of Vehicles in Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	PRE-COLLISION ACTION											
	Going straight	Right turn	Left turn	Slowing/ Stopping	Stopped in Traffic	Avoid object	Change lanes	Overtaking	Backing	Skidding	Swerving	Other
No N=20,103	58%	3%	5%	4%	8%	1%	2%	2%	2%	6%	2%	7%
Yes N=20,139	59%	5%	18%	4%	9%	0%	1%	1%	0%	2%	0%	1%
B.C. Total N=40,232	58%	4%	11%	4%	8%	0%	1%	1%	1%	4%	1%	7%

Table 12
Vehicle Manoeuver at Point of Impact in Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	VEHICLE MANOEUVER									
	Rear End	Head On	Side Swipe	Intersecting at 90°	Overtaking	Right turn	Left turn	Run off road to right	Run off road to left	Other
No	28%	7%	5%	5%	3%	1%	3%	26%	18%	4%
Yes	28%	2%	1%	43%	2%	1%	15%	4%	2%	2%
B.C. Total	28%	5%	3%	23%	3%	1%	9%	16%	11%	1%

Post-collision and Contributing Factors:

Table 13 shows that non-intersection casualty traffic accidents tend to produce more severe vehicle damage than did intersection casualty accidents, and this is reflected in the 2.4% fatality rate for non-intersection casualty accidents as opposed to the 0.9% fatality rate for intersection casualty accidents. Both intersection and non-intersection casualty accidents had about the same proportion of hit-and-run occurences (4.5% vs. 4.2%).

Table 14 compares these two types of casualty accidents in terms of commonly cited contributing factors determined by the investigating police officers. (As there can be as many as three factors per vehicle, these proportions can add to more than 100%). The four most frequently cited contributing factors for intersection casualty accidents were failure to yield right of way (29%), driving without due care (25%), unsafe speed (10%), and alcohol (9%), while for non-intersection casualty accidents they were driving without due care (30%), unsafe speed (19%), alcohol (17%) and weather (14%).

PERSONS INVOLVED:

Table 15 shows that both intersection and non-intersection casualty accidents involved similar proportions of drivers (64% vs. 62%) and similar proportions of pedestrians (3%), while intersection accidents involved a somewhat smaller proportion of passengers (30% vs. 33%) and a larger proportion of cyclists (3% vs. 2%). It should be noted that these figures represent those involved who were injured as well as those who escaped injury.

Table 13
Damage Severity to Vehicle in Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	DAMAGE SEVERITY				
	No Damage	Light Damage	Moderate Damage	Severe Damage	Demolished
No N=18,392	9%	27%	27%	21%	16%
Yes N=17,957	9%	31%	32%	20%	8%
B.C. Total N=36,349	9%	29%	30%	21%	12%

Table 14
Contributing Factors to Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	CONTRIBUTING FACTORS						
	% Driving w/o Due Care	% Alcohol Related	% Driving at Unsafe Speed	% Fail to Yield	% Due to Weather	% Following too Closely	% Vehicle Fault
No	30%	17%	19%	5%	14%	7%	5%
Yes	25%	9%	10%	29%	7%	7%	3%
B.C. Total	27%	13%	15%	16%	11%	7%	4%

Table 15
Persons Involved in Casualty Accidents:
Intersection vs. Non-intersection.
British Columbia, 1985.

Intersection Accident	PERSONS INVOLVED			
	Drivers	Passengers	Pedestrians	Cyclists
No N=32,583	62%	33%	3%	2%
Yes N=32,037	64%	30%	3%	3%
B.C. Total N=64,620	63%	32%	3%	2%

Drivers and Passengers:

From Table 16 it can be seen that intersection casualty accidents on an average involved older drivers (35 yrs. vs. 33 yrs.) with a lower proportion of male drivers (67% vs. 72%), while Figure 3 shows that, like non-intersection casualty accidents, intersection casualty accidents involved a high proportion of drivers in the 20-30 year old range for both genders (although to a lesser extent for female drivers).

Again from Table 16 it can be seen that, when compared to non-intersection casualty accidents, intersection casualty accidents involved fewer passengers per vehicle (0.51/vehicle vs. 0.58/vehicle), especially fewer male passengers (0.22 vs. 0.29 per vehicle). However, it should be noted that the majority of vehicles in both intersection (66%) and non-intersection casualty accidents (62%) carried no passengers. Finally, intersection casualty accidents had a higher reported restraint device use level (91% vs. 84%) than did non-intersection casualty accidents.

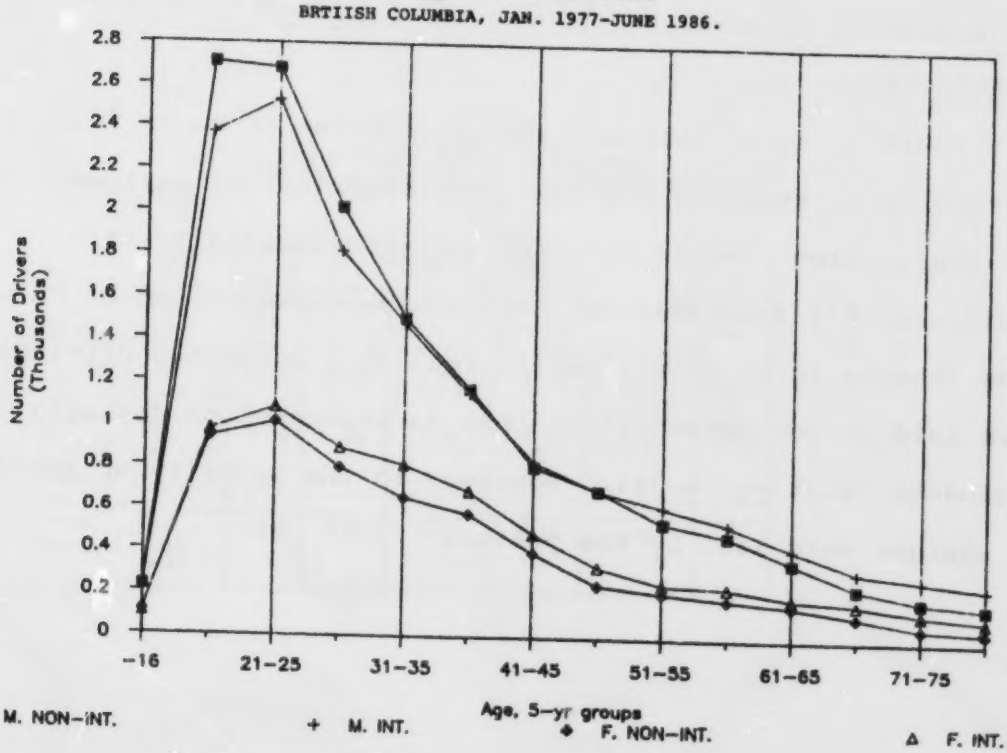
Although Table 16 shows that more male drivers were involved in intersection casualty accidents than were female drivers (67% vs. 33%), Table 17 shows that, of female drivers involved in casualty accidents, 53% were involved in intersection casualty accidents, while the figure for male drivers was 49%.

Comparing male and female drivers and their passengers involved in intersection casualty accidents, Table 17 shows that they are very similar in terms of average age, average number of passengers and percent of vehicles carrying passengers. On the

Table 16
Characteristics of Persons in Vehicles:
Intersection vs. Non-intersection Casualty Accidents.
British Columbia, 1985.

VARIABLE	INTERSECTION CASUALTY ACCIDENT	NON-INTERSECTION CASUALTY ACCIDENT	B.C. TOTAL
Average Driver's Age	34.7 yr.	32.9 yr.	33.8 yr.
% Male Drivers	66.6%	71.5%	69.5%
Average # Passengers in vehicle	0.51	0.58	0.54
Average # Male Passengers in vehicle	0.22	0.29	0.26
Average # Female Passengers in vehicle	0.28	0.28	0.28
Average Passenger's age	24.2 yr.	23.6 yr.	23.9 yr.
Average Male Passenger's age	21.0 yr.	21.6 yr.	21.3 yr.
Average Female Passenger's age	27.5 yr.	26.3 yr.	26.9 yr.
% Vehicles with Passengers	34.2%	37.8%	36.0%
% Vehicles with Male Passengers	17.2%	21.9%	19.5%
% Vehicles with Female Passengers	21.5%	21.6%	21.6%
% Occupant Seat Belt use	91.1%	84.4%	87.7%

FIGURE 3
DRIVER AGE AND GENDER BY NUMBER OF CASUALTY ACCIDENTS:
INTERSECTION VS. NON-INTERSECTION.
BRTIISH COLUMBIA, JAN. 1977-JUNE 1986.



other hand, male drivers tended to carry older passengers (26 yrs. vs. 21 yrs.), a higher proportion of male passengers, a lower proportion of female passengers, and showed a lower proportion of vehicle occupants using restraint devices.

PERSONS INJURED:

On an average in 1985, intersection casualty accidents injured 1.4 persons per accident and killed 0.01 for a total of 15,134 injuries and 113 deaths, while non-intersection casualty accidents injured an average of 1.4 persons per accident and killed an average of 0.03 per accident, for a total of 18,484 injuries and 367 deaths. Tables 18, 19, and 20 reflect the more serious nature of non-intersection casualty accidents in terms of injured persons' state of consciousness, injury types and injury locations. It should be noted that these assessments refer to the most serious injury to the person and were determined by the investigating officer, as opposed to by a physician.

CHARGES LAID:

Table 21 shows that a higher proportion of Motor Vehicle Act charges (e.g. speeding, failure to yield right of way) were laid in intersection than in non-intersection casualty traffic accidents (47% vs. 33%), but that a higher proportion of Criminal Code charges (e.g. Driving While Impaired, Dangerous Driving) were laid in non-intersection than in intersection casualty accidents (6.5% vs. 4.7%). However, in the majority of accidents no charges were laid by the police.

Table 17
Characteristics of Persons in Vehicles:
Intersection vs. Non-intersection Casualty Accidents
Comparison of Male and Female Drivers.
British Columbia, 1985.

VARIABLE	MALE DRIVERS			FEMALE DRIVERS		
	Intersection N=13,646 (49.3%)	Non-int'section N=14,023	B.C. Total	Intersection N=6,552 (53.4%)	Non-int'section N=5,609	B.C. Total
Average Driver's Age	34.5 yr.	32.6 yr.	33.6 yr	35.0 yr.	33.2 yr.	34.2 yr
% Male Drivers in other vehicle	67.6%	72.5%	69.7%	66.8%	66.1%	66.6%
Average # Passengers in vehicle	0.52	0.60	0.56	0.52	0.56	0.54
Average # Male Passengers in vehicle	0.23	0.32	0.27	0.21	0.25	0.22
Average # Female Passengers in vehicle	0.28	0.27	0.28	0.30	0.31	0.31
Average Passenger's Age	25.6 yr.	24.2 yr.	24.9 yr	21.4 yr.	22.1 yr.	21.8 yr
Average Male Passenger's age	21.6 yr	21.5 yr	21.6 yr	19.7 yr.	22.2 yr.	20.9 yr
Average Female Passenger's age	29.7 yr.	28.0 yr.	28.8 yr	23.4 yr.	22.7 yr.	23.1 yr
% Vehicles with Passengers	34.9%	39.3%	37.2%	34.6%	36.4%	35.4%
% Vehicles with Male Passengers	18.1%	23.5%	20.8%	16.2%	19.1%	17.6%
% Vehicles with Female Passengers	21.3%	21.4%	21.4%	23.0%	23.7%	23.3%
% Occupant Seat Belt use	89.6%	82.3%	85.8%	94.0%	89.3%	91.6%

Table 18
Injured Persons' State of Consciousness:
Intersection vs. Non-intersection Casualty Accidents.
British Columbia, 1985.

Intersection Accident	STATE OF CONSCIOUSNESS					
	Appears Normal	Agitated	Incoherent	Semi-conscious	Unconscious	Appears Dead
No N=18,269	73.8%	16.5%	2.2%	4.3%	1.2%	2.0%
Yes N=14,808	79.6%	14.8%	1.5%	2.5%	0.7%	0.7%
B.C. Total N=33,077	76.4%	15.8%	1.9%	3.5%	1.4%	1.4%

Table 19
Victims' Injury Type:
Intersection vs. Non-intersection Casualty Accidents.
British Columbia, 1985.

Intersection Accident	INJURY TYPE							
	Abrasion	Bruise	Laceration	Bleeding	Fracture	Dislocation	Concussion	Whiplash
No N=16,144	12.4%	43.6%	15.7%	8.5%	9.7%	3.6%	2.6%	3.3%
Yes N=12,297	12.37	57.6%	11.4%	6.6%	6.9%	3.6%	2.7%	4.3%
B.C. Total N=28,766	12.4%	46.5%	13.7%	7.6%	8.4%	3.6%	2.6%	3.7%

Table 20
Victims' Injury location:
Intersection vs. Non-intersection Casualty Accidents.
British Columbia, 1985.

Intersection Accident	INJURY LOCATION					
	Head/ Neck	Chest/ Back	Arm/ Shoulder	Abdomen/ Hip	Lower Leg	All Body
No N=18,338	52.3%	13.9%	13.6%	5.9%	11.0%	3.2%
Yes N=14,831	53.3%	13.5%	11.6%	6.7%	12.8%	2.1%
B.C. Total N=33,169	52.8%	13.7%	12.7%	6.2%	11.8%	2.7%

Table 21
Motor Vehicle Act and Criminal Code Charges Laid:
Intersection vs. Non-intersection Casualty Accidents.
British Columbia, 1985.

Intersection Accident	Motor Vehicle Act		Criminal Code	
	% Accidents where charges were laid	Average # Charges/ Accident	% Accidents where charges were laid	Average # Charges/ Accident
No	33.2%	0.38	6.5%	0.12
Yes	47.0%	0.54	4.7%	0.09
B.C. Total	39.3%	0.45	5.7%	0.10

CONCLUSIONS

To summarize, 42% to 46% of all casualty accidents in B.C. occurred where one road crossed another, with the highest number and lowest proportion occurring during the summer months. They happened most frequently in business and shopping areas, especially during the evening "rush hours". They tended to occur in daylight or in good artificial lighting and primarily in good weather, although about a third occurred in wet conditions.

Turning to the traffic control devices at the accident scene, a third of the casualty intersection accidents occurred where there were no traffic signs or signals, a third where there were stop signs, and a third were there were stop lights. Of the latter, 45% occurred on a red light, 45% on a green light, and 10% on an amber light. It is noteworthy that, contrary perhaps to the popular impression, only 3% of all intersection casualty accidents occurred on an amber light and 14% on a red light, leaving 83% not associated with automatic traffic signal violations.

Over 80% of these intersection casualty accidents were multiple-vehicle accidents, with only 9% involving pedestrians and 8% involving bicycles. In 43% of the instances one vehicle struck the other at a 90° angle, while 28% involved rear-end collisions. The causes included Failure to Yield the Right of Way (29%), Driving Without Due Care (25%), Unsafe Speed (10%) and Alcohol (9%).

Comparing intersection casualty accidents to non-intersection casualty accidents, the drivers in intersection accidents were older (average age 35 years), carried fewer passengers (65% carried no passengers), and reported a higher frequency of restraint device use. While 67% of the drivers in these accidents were male, half of all male drivers and over half of all female drivers who had casualty traffic accidents in 1985 had them at intersections. The male drivers in these accidents reported lower restraint device use in their vehicles and carried older passengers than did the female drivers. Overall, intersection casualty accidents produced a lower proportion of fatalities and less severe injuries than did non-intersection casualty accidents.

In terms of countermeasures, high-visibility police enforcement campaigns at controlled intersections has shown promise as a way to reduce, at least for the duration of the campaign, driving behaviours that could lead to traffic accidents (Mercer, 1986). However, as two-thirds of intersection accidents occurred at intersections with no traffic signs or signals, or at intersections with only stop signs, and as these sorts of intersections are far too numerous to be included in targetted intersection enforcement campaigns, it follows that driver education dealing with right-of-way and driver courtesy may help to reduce these accidents. Further, as a high proportion of intersection casualty accidents involve rear-end collisions, driver education on following distances might be considered.

The target groups for such education materials ought to focus on adult drivers carrying no passengers who are on the road during "rush hours", and on adult female drivers carrying young passengers. Themes that could prove useful might include the notion of not carrying the day's work stress over into the task of driving home, of responsibility to those waiting at home, and, especially for the female driver, responsibility for her young passengers.

Finally, unlike the speed-and-alcohol traffic accidents that tend not to occur at intersections, intersection casualty accidents appear to be less of a product of "lifestyle" and more of a product of inattention, discourtesy, and perhaps ignorance of the basic rules of the road. Consequently, with a combination of public education and police enforcement programs, there is reason to hope that these accidents could be successfully reduced.

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Aspects of Weather-Related Casualty Traffic Accidents British Columbia, 1984

SUMMARY

In 1984 the 2,587 reported weather-related casualty traffic accidents in British Columbia comprised 11.1% of all casualty traffic accidents, caused 3,270 injuries and 48 deaths, and cost the Insurance Corporation of B.C. approximately $52.6 million in insurance payments for medical and other damages. Weather was the fifth most frequently cited cause of casualty traffic accidents, following Driving Without Due Care (29.1%), Failure to Yield Right of Way (17.5%), Alcohol Involvement (15.2%), and Excessive Speed (15.2%), and in sum totalled nearly the number of pedestrian and motorcycle casualty accidents combined.

In many ways the typical weather-related casualty traffic accident resembles the typical alcohol-related casualty traffic accident: both are high-speed single-vehicle runoffs that occur at night at a curve in the road in rural areas and involve young male drivers. The differences between them are that in the one instance the driver's ability is impaired by the driving conditions (rain, snow, ice) and in the other instance the driver's ability is impaired by alcohol.

Finally, it must be stressed that these casualties must not be treated as if there is nothing that can be done to reduce their number and the attendant expense to the province. Short-term, high-intensity public education during periods of elevated risk can reduce alcohol-related accidents, and there is no compelling reason to assume that the same cannot be accomplished with regard to weather-related accidents. Educational programs and campaigns, combined with improved road surface management, have the potential to significantly reduce weather-related casualty traffic accidents in British Columbia.

ASPECTS OF WEATHER-RELATED CASUALTY TRAFFIC ACCIDENTS, BRITISH COLUMBIA, 1984.

In 1984 the 2,587 reported weather-related casualty traffic accidents in British Columbia comprised 11.1% of all casualty traffic accidents, caused 3,270 injuries and 48 deaths, and cost the Insurance Corporation of B.C. approximately $52.6 million in insurance payments for medical and other damages. Weather was the fifth most frequently cited cause of casualty traffic accidents, following Driving Without Due Care (29.1%), Failure to Yield Right of Way (17.5%), Alcohol Involvement (15.2%), and Excessive Speed (15.2%), and in sum totalled nearly the number of pedestrian and motorcycle casualty accidents combined.

Clearly, weather is a major contributor to casualty traffic accidents in the province. Unfortunately, because there is little one can do about the weather there is a tendency to relegate these accidents to an "Acts of God" classification and then to ignore possible countermeasures. Consequently, it is the purpose of this paper to examine the characteristics of weather-related casualty traffic accidents through an analysis of the Traffic Accident Report Forms (MV104) completed by the investigating police officer and compiled by the Motor Vehicle Department of the B.C. Ministry of Transportation and Highways.

RESULTS

Extent of Problem:

In 1984 weather-related traffic accidents in British Columbia killed 48 persons and injured 3,270 persons. They

comprised 11.1% of all casualty traffic accidents and cost I.C.B.C. approximately $52.6 million, calculated at $14,000 per injury and $9,000 per death.

Time, Month:

From Figure 1 it can be seen that weather-related casualty traffic accidents, like casualty traffic accidents that were not weather-related, were most frequent between 4 p.m. and 6 p.m. However, unlike non-weather-related accidents, they also peaked between 7 a.m. and 9 a.m. These two peaks for these weather-related accidents coincide with the dense traffic periods of "rush hour".

From Figure 2 it can be seen that weather-related casualty traffic accidents were most frequent during the fall and winter months and least frequent in the summer, while non-weather-related casualty traffic accidents had the opposite frequency pattern.

Collision Type, # Vehicles, Commercial Vehicles:

Table 1 shows that, when compared to casualty traffic accidents that were not weather-related, weather-related casualty traffic accidents more frequently involved collisions with stationary objects. This fact is reflected by the finding that 52% of these weather-related accidents were single-vehicle-only accidents, as opposed to only 37% of the non-weather-related casualty traffic accidents in 1984. As to the sort of vehicle involved, 7.1% of the weather-related and 4.8% of the non-weather-related casualty traffic accidents involved commercial vehicles.

FIGURE 1

Time of Day

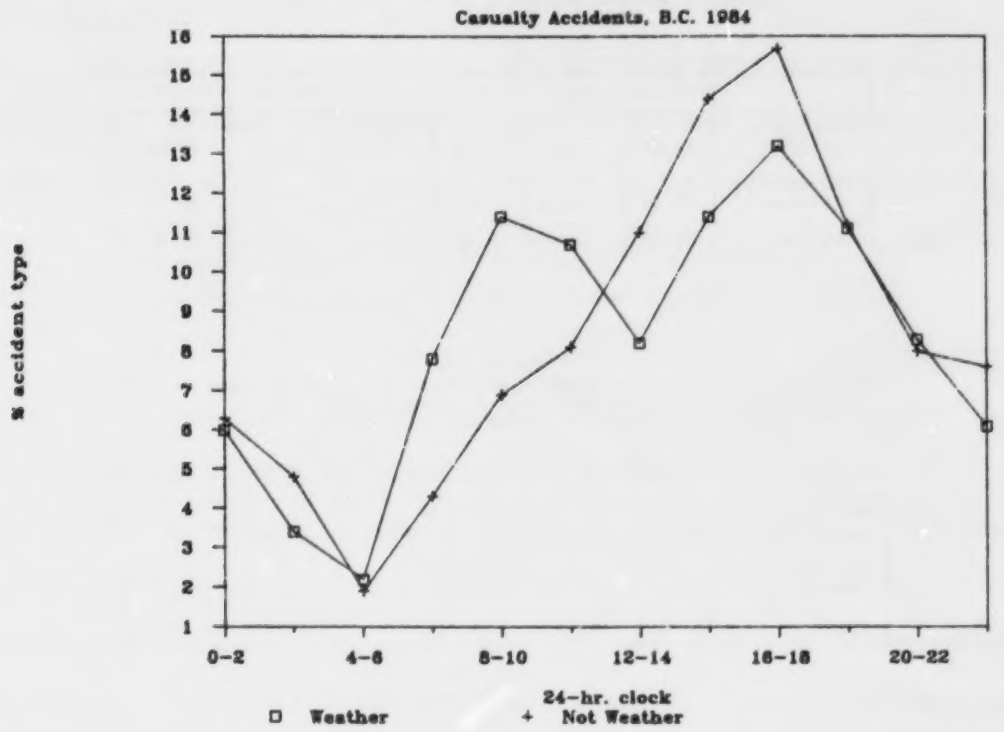


FIGURE 2

Month

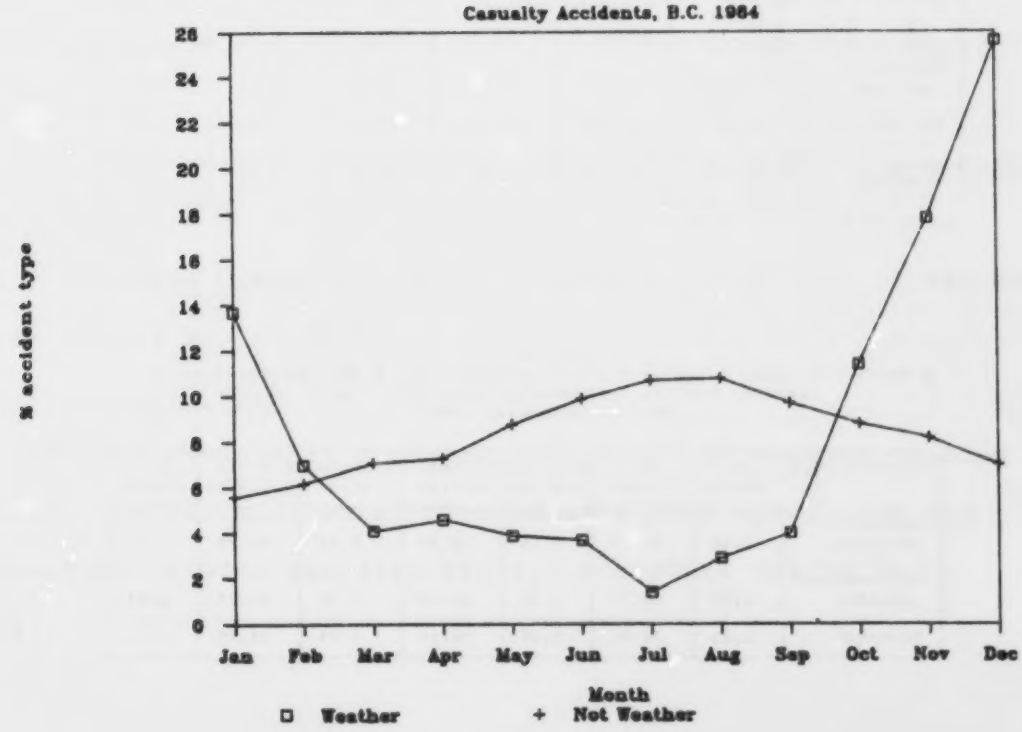


Table 1
% Weather-Related Casualty Traffic Accidents vs. % Not Weather-Related Casualty Traffic Accidents by Collision Type
British Columbia, 1984.

Accident Type	% Other Vehicle	% Motor Cycle	% Pedestrian	% Bicycle	% Other Moving	% Stationary Obj.
Weather-Related	54.0%	1.5%	7.7%	1.7%	0.8%	34.3%
Not Weather Related	57.6%	4.5%	9.5%	8.5%	1.2%	18.7%
Province	57.2%	4.2%	9.3%	7.8%	1.2%	20.3%

Table 2
% Weather-Related Casualty Traffic Accidents vs. % Not Weather-Related Casualty Traffic Accidents by Road Surface
British Columbia, 1984.

Accident Type	% Dry	% Wet	% Mud	% Snow	% Slush	% Ice
Weather-Related	1.7%	49.4%	0.4%	14.3%	6.5%	27.6%
Not Weather Related	67.3%	27.6%	0.1%	1.5%	0.6%	2.9%
Province	60.0%	30.0%	0.2%	2.9%	1.3%	5.6%

Table 3
% Weather-Related Casualty Traffic Accidents vs. % Not Weather-Related Casualty Traffic Accidents by Accident Location
British Columbia, 1984.

Accident Type	Total Number	Location				
		% intersection	% between inters.	% "T" junction	% bridge	% other
Weather-Related	2,525	30.8%	52.8%	4.2%	4.6%	7.7%
Not Weather Related	20,202	45.6%	39.1%	6.5%	1.8%	7.0%
Province	22,727	44.0%	40.6%	6.2%	2.1%	7.1%

Table 4
% Weather-Related Casualty Traffic Accidents vs. % Not Weather-Related Casualty Traffic Accidents by Land Use in Area
British Columbia, 1984.

Accident Type	% School	% Houses	% Apartments	% Commercial	% Industrial	% Agricultural	% Parks
Weather-Related	2.1%	25.1%	3.8%	18.9%	6.4%	40.9%	2.8%
Not Weather Related	2.8%	30.5%	5.2%	30.0%	6.1%	22.9%	2.4%
Province	2.8%	29.9%	5.0%	28.8%	6.2%	24.9%	2.5%

Accident Environment:

In 42% of the weather-related casualty traffic accidents in 1984 in B.C. it was raining at the time of the accident, 21% cloudy, 19% snowing, 14% clear, and 3% foggy. The road surfaces were wet in 49% of the instances, snow or slush in 20%, and ice in 28%, as can be seen from Table 2. As to the lighting, 50.4% of the weather-related casualty traffic accidents occurred between dusk and dawn inclusive, while the figure for non-weather-related casualty traffic accidents was 37.5%.

As can be seen from Table 3, these weather-related accidents occurred more often between intersections (52.8%) than did non-weather-related accidents (39.1%). In addition, they occurred more often in agricultural and less often in commercial and residential areas than did non-weather-related casualty accidents, as is illustrated in Table 4. This latter relationship is reflected in the finding that 44.9% of the weather-related and only 27.7% of the non-weather-related casualty traffic accidents occurred in rural areas.

Finally, weather-related casualty traffic accidents occurred more frequently on curved portions of the road than did non-weather-related casualty traffic accidents (36.1% vs. 21.9%) and slopes (46.0% vs. 33.3%).

Contributing Factors:

Table 5 shows that a higher proportion of weather-related casualty traffic accidents involved excessive speed than did non-weather-related casualty traffic accidents (24.5% vs. 14.1%).

Table 5
% Weather-Related Casualty Traffic Accidents vs. % Not Weather-Related Casualty Traffic Accidents by Contributing Factors
British Columbia, 1984.

Accident Type	% Due Care	% Not Yield	% Alcohol	% Speeding	% Tailgate	% Vehicle Fault
Weather-Related	16.6%	8.5%	6.7%	24.6%	5.9%	4.1%
Not Weather Related	30.7%	18.6%	16.2%	14.1%	7.7%	4.2%
Province	29.1%	17.5%	15.2%	15.2%	7.5%	4.2%

NOTE: As there are up to three indicated contributing factors per driver, these figures can total to more than 100%.

FIGURE 3

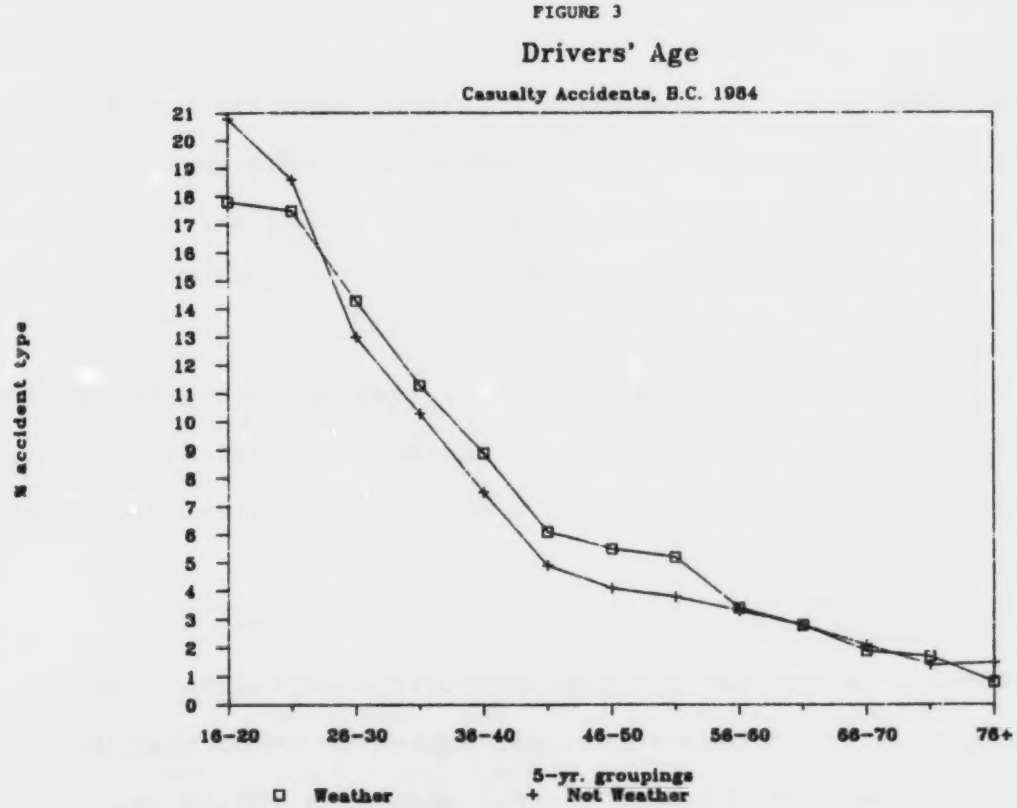


Table 6
% Weather-Related Casualty Traffic Accidents by Police Jurisdiction
British Columbia, 1984.

Police Jurisdiction	Total # Cas. Acc.	% Weather-Related
Kelowna RCMP Subdivision		
Municipal Detachments	912	6.9%
Rural Detachments	995	16.3%
Kamloops RCMP Sub.		
Municipal Detachments	583	6.0%
Rural Detachments	825	19.4%
Nelson RCMP Subidvision		
Municipal Detachments	169	14.8%
Rural Detachments	810	19.3%
Prince George RCMP Sub.		
Municipal Detachments	623	8.0%
Rural Deatchments	846	16.4%
Prince Rupert RCMP Sub.		
Municipal Detachments	178	12.9%
Rural Detachments	441	22.2%
RCMP District 1		
Municipal Detachments	6,250	9.5%
Rural Detachments	789	15.7%
Victoria Area RCMP		
Municipal Detachments	638	11.3%
Rural Detachments	803	12.7%
Courtenay RCMP Sub.		
Municipal Detachments	412	7.8%
Rural Detachments	745	15.4%
Freeway RCMP	604	16.6%
Independent Forces		
Vancouver Area	5,053	8.5%
Victoria Area	1,470	6.7%
Nelson City	36	2.8%
Province	23,182	11.1%

On the other hand, they involved a lower proportion of Driving Without Due Care (16.6% vs. 30.7%), Failure to Yield the Right of Way (8.5% vs. 18.6%), and Alcohol (6.7% vs. 16.2%).

Driver Age, Gender:

Using the gender of the first driver indicated on the Traffic Accident Report Form, approximately 69% of the weather-related casualty traffic accidents and 72% of the non-weather-related casualty traffic accidents involved male drivers. As to driver age, Figure 3 shows that the proportions of weather-related and non-weather-related casualty traffic accidents parallel each other across age groups, with both types occurring in higher proportions in the younger driver groups.

Geographic Locations:

Table 6 illustrates the proportion of weather-related casualty traffic accidents by police reporting groups throughout British Columbia. Generally, the rural detachments reported a higher proportion of these accidents than did the municipal detachments, although the municipal detachments in the Prince Rupert and Victoria Areas and the Freeway RCMP reported proportions nearly as high as the more rural areas.

DISCUSSION

In many ways the typical weather-related casualty traffic accident resembles the typical alcohol-related casualty traffic accident: both are high-speed single-vehicle runoffs that occur at night at a curve in the road in rural areas and involve young male drivers. The differences between them are that in the one

instance the driver's ability is impaired by the driving conditions (rain, snow, ice) and in the other instance the driver's ability is impaired by alcohol.

Considering countermeasures, again a parallel can be drawn -- if public education as to the effects of the impairing element can reduce alcohol-related accidents, perhaps a similar approach with regard to rainy, snowy and icy weather conditions and how they affect driving and how to cope with them should be undertaken. For example, the public could be made aware of the extra caution and reduced speed that must accompany driving in even moderately bad weather. In addition, as about half of these weather-related accidents occur in conditions of snow, slush or ice, some consideration as to improving these road conditions through ploughing, sanding or salting could prove useful.

Finally, it must be stressed that these casualties must not be treated as if there is nothing that can be done to reduce their number and the attendant expense to the province. Short-term, high-intensity public education during periods of elevated risk can reduce alcohol-related accidents, and there is no compelling reason to assume that the same cannot be accomplished with regard to weather-related accidents. Educational programs and campaigns, combined with improved road surface management, have the potential to significantly reduce weather-related casualty traffic accidents in British Columbia.

SECTION 3

CAUSES OF FATAL TRAFFIC ACCIDENTS

Coroner and Police (MV104) Accident Cause Frequencies
British Columbia, 1984

The Measurement of the Contribution of Alcohol
to Fatal Traffic Accidents
British Columbia, 1984

Coroner and Police (MV104) Accident Cause Frequencies
British Columbia, 1984

SUMMARY

A comparison of police (MV104) and coroner reports on the causes of fatal traffic accidents in British Columbia in 1984 revealed substantial differences between the two data sets. Generally, the police portrayed these accidents as primarily the driver's fault, in terms of dangerous and illegal driving behaviours, with a high proportion of the accidents being alcohol-related. On the other hand, coroners' reports tended to characterize these fatalities as more of a product of circumstances, less as the driver's fault, and less as a consequence of alcohol impairment.

As the police have more experience in accident investigation and have standardized accident investigation protocols and forms, it is likely their data are more reliable than the coroners' written text. However, the difference between these two perspectives needs further investigation. Consequently it is recommended that similar fatal accident protocols and forms be developed for each group so that their perceptions of fatal traffic accident causes can be more accurately compared and agreement on the probable causes achieved.

AS PRIMARY CAUSE - POLICE DATA	AS CORONER CAUSAL STATEMENT
Alcohol Involvement (42%)	Alcohol (29%)
Driving Without Due Care (15%)	Driving in Excess of Speed Limit (7%)
Unsafe Speed (12%)	Loss of Control (7%)
Wrong Side of Road (6%)	Ice/Snow/Slush on Road (5%)
Failure to Yield Right of Way (5%)	Ambient Atmospheric Conditions (4%)
Weather (4%)	Pedestrian Walking on Roadway (3%)
Driver Inexperience (2%)	Tires and Wheels (3%)
Officer/Flagman/Guard Ignored (2%)	Water on Road (3%)
Improper Passing (1%)	Other Pedestrian Action (2%)
Illness (1%)	Heart Attack (2%)
Pedestrian Error/ Confusion (1%)	Fatigue (2%)
Improper Turn (1%)	Driving too Fast for Conditions (2%)
Extreme Fatigue (1%)	

CORONER AND POLICE (MV104) ACCIDENT CAUSE FREQUENCIES. BRITISH COLUMBIA, 1984.

In order to allocate resources to reduce the frequency of fatal traffic accidents, it is necessary to know their causes. However, a fatal traffic accident is a complex phenomenon, and its causes are therefore subject to interpretation. In British Columbia, there are two sources of information on the causes of these accidents -- police accident reports and coroner's reports. It is the purpose of this paper to compare these two data sources in order both to report on the most frequent causes of fatal traffic accidents and to compare the police and coroners' perspectives on these accidents.

METHOD

Police Accident Reports:

In British Columbia a police officer assigned to a traffic section investigates about 47 casualty traffic accidents per year (i.e. an accident where somebody is seriously injured or killed) and reports on these accidents using the Motor Vehicle Department Traffic Accident Report Form (MV104). This form has been used, with minor changes, by the police throughout the province since 1977. The provincial Motor Vehicle Act (section 61) requires the drivers in and witnesses to an accident to respond to questions pertaining to the accident, and to help elicit honest responses, the law states that their answers can not be used as evidence in court.

The MV104 itself consists of, among other things, a set of descriptors of accident causes from which the investigating team

may choose primary, secondary, and tertiary causes of the accident for each driver in the accident. (See Appendix A of this paper for the MVA sections and copy of the MV104.)

Coroner Reports:

Coroners in B.C. are appointed by the Attorney General and, in the case of a fatal traffic accident, may conduct either an inquiry or an inquest. Motor vehicle fatalities comprise about 40% of the 100 or so inquests per year in B.C. and about 6% of the approximately 8,000 inquiries carried out per year. As there are about 130 coroners in the province, it follows that, on the average, a B.C. coroner investigates about three traffic deaths per year and holds fewer than one traffic-related inquest per year. In these processes he completes a textual commentary on the accident, either in terms of an investigation or inquest form. (See Appendix B of this paper for the Coroner's Act sections and the investigations and inquest report forms.)

Analyses:

The B.C. coroner investigation and inquest reports for 1984 were coded into computer readable form by the Traffic Injury Research Foundation (Ottawa, Ontario) using a coding system developed by TIRF. The causes of these fatal accidents were classified in terms of direct coroner statements concerning accident causes, and in terms of causes that the TIRF coding team could reasonably infer from the coroner's descriptions, even though the report did not specifically identify the inference as a direct cause. For example, if the investigating coroner stated alcohol was a cause of the accident, it was coded as a coroner

statement, but if in the text of the coroner's investigation report it was mentioned that the driver had been drinking, it was coded as a TIRF inference cause.

Fatal accident MV104 causal factors were used to code the police causal factor data for 1984. If the MV104 indicated the factor to be the primary causal factor for the accident it was coded as such, while if it was a secondary or tertiary factor for the first driver, or a causal factor at any level for other drivers, it was coded as an "other factor". (See Tables 1 through 6 for a comparison of the TIRF and MV104 coding systems)

Finally, the coded police and coroner data on causes of fatal traffic accidents were compared in terms of the frequency and percentage of times each cause was cited as: primary MV104 vs. direct coroner statement; other MV104 vs. TIRF inference; and total MV104 vs. total coroner report causes.

RESULTS

Causes per Accident:

Of the 447 fatal traffic accidents investigated by the police in 1984, 22 (4.9%) had missing causal factors and 71 (15.9%) were coded "does not apply", indicating no contributing factors were coded. Of the remaining 354 fatal accidents, there was a total of 354 primary cause citations and 404 other cause citations, which averaged 1 primary cause, 1.14 other causes and 2.14 causes in total per causally judged accident.

Of the 461 fatal traffic accidents investigated by the coroner's office in 1984, and coded by TIRF, 76 (16.5%) had missing causal factors. Of the remaining 385, there was a total of 356 coroner's statements as to accident cause and 797 TIRF

inferences as to accident cause, which averaged 0.92 coroner-stated causes, 2.07 TIRF inferred causes and 2.99 causes in total per causally judged accident.

Frequency of Cause Citation:

Tables C.1 through C.3 in Appendix C of this paper show the number and percentage of cause citations from the 1984 police MV104 fatal traffic accident reports for each of: primary causes, other causes, and total causes. Tables C.4 through C.9 in Appendix C show the number and percentage of cause citations from the 1984 coroner reports (as coded by TIRF) for each of: coroner's statement of cause, TIRF inference as to cause, and total causes cited.

Table 7 shows the most frequently cited MV104 primary causes, other causes, and total causes for B.C. 1984 police investigated fatal traffic accidents. Table 8 shows the most frequent coroner data causes in terms of direct coroner statement, TIRF inference, and as any cause from the coroner's reports for B.C. 1984 traffic deaths.

In addition to the information presented in Tables 7 and 8, the tables in Appendix C of this paper yielded a number of other specific points that should be noted in order to understand the differences between the two data sets.

The sum of the coroner data citations for "pedestrian action" (TIRF code 4.4.7.0) as percentages of each category was: 8% for direct coroner statement, 7% for TIRF inference and 7% overall. These data are roughly comparable to the MV104 "pedestrian error/confusion" figures of 1% primary cause, 5% other cause and 3% any cause noted in Table 7.

TABLE 1
HUMAN CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code	POLICE CODING CATEGORIES	MV104 code #
HUMAN FACTORS	1.0.0.0		
Critical Nonperformance	1.1.0.0		
States of Sleep	1.1.1.0	Fell Asleep	19
Acute Medical Condition	1.1.2.0	Sudden Loss of Consciousness	23
seizure	1.1.2.1		
heart attack	1.1.2.2		
stroke	1.1.2.3		
other acute medical	1.1.2.4		
Other Critical Non-performance	1.1.3.0		
Psychomotor Capability	1.2.0.0		
Physical Factors	1.2.1.0		
physical handicap	1.2.1.1	Pre-Existing Physical Disability	26
medical condition	1.2.1.2	Illness	22
sensory deficiency (vision, hearing)	1.2.1.3		
physical interruptions (eg sneezing)	1.2.1.4		
other physical factors	1.2.1.5		
Mental Factors	1.2.2.0		
mental condition/state	1.2.2.1		
mental attributes	1.2.2.2		
emotional upset/state	1.2.2.3		
other mental factors	1.2.2.4		
Fatigue	1.2.3.0	Extreme Fatigue	16
Other Psychomotor	1.2.4.0		
Alcohol, Other Drugs and Substances	1.3.0.0		
Alcohol	1.3.1.0	Alcohol Involvement	10
Canabis	1.3.2.0		
Prescription or Over-the-Counter Drugs	1.3.3.0	Prescribed Medication	27
Illegal Drugs	1.3.4.0	Drugs (Illegal)	15
Other Drugs and Substances	1.3.5.0		
Other human condition, attribute, or state not specifically classified above	1.4.0.0		

TABLE 2
ENVIRONMENTAL CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code #	POLICE CODING CATEGORIES	MV104 code #
ENVIRONMENTAL FACTORS	2.0.0.0		
Highway Factors	2.1.0.0		
Design and/or construction of hwy. and components	2.1.1.0		
roadway/intersection design	2.1.1.1	Road/Intersection Design	73
improperly banked curves	2.1.1.2		
deficient signing	2.1.1.3	Sign Obstruction	69
deficient traffic control	2.1.1.4	Insufficient Traffic Control	72
other highway design	2.1.1.5		
Highway maintenance	2.1.2.0	Road Maintenance/Construction	67
road surface damage/irregularity	2.1.2.1	Pavement Defective	64
drop-offs at pavement edge	2.1.2.2		
road shoulders	2.1.2.3		
excessive road crowns	2.1.2.4		
road surface upkeep (winter)	2.1.2.5		
road surface upkeep/clearance (other)	2.1.2.6		
damage/disrepair signs, signals etc.	2.1.2.7		
other highway maintenance	2.1.2.8		
Other highway structures	2.1.3.0		
Road Surface Factors	2.2.0.0		
Water on road	2.2.1.0		
Ice/snow/slush on road	2.2.2.0		
Other material on paved road surface	2.2.3.0		
"Polished" smooth road surface	2.2.4.0		
Unpaved road	2.2.5.0		
Other road surface	2.2.6.0		

TABLE 2 cont'. ENVIRONMENTAL CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code #	POLICE CODING CATEGORIES	MV104 code #
ENVIRONMENTAL FACTORS	2.0.0.0		
Transitory Hazards	2.3.0.0		
Animal on road	2.3.1.0	Domesticated Animal	70
		Wild Animal	71
Stopped vehicle on road	2.3.2.0	Previous Traffic Incident	68
Other object(s) on road	2.3.3.0	Obstruction/Debris on Road	63
Unidentified vehicle involvement	2.3.4.0		
"Acts of God"	2.3.5.0		
Weather-related factors	2.3.6.0	Weather	66
storm conditions	2.3.6.1		
fog	2.3.6.2		
wind	2.3.6.3		
other weather-related	2.3.6.4		
Evasive Route Obstructions - the absence of roadway space adequate for the performance of evasive driving maneuvers (either emergency or non-emergency). e.g. traffic stopped on road shoulder, trees, fixed objects interrupting continuous road shoulder, narrow bridge.	2.4.0.0	Roadside Hazard	74
Other - any other environmental factor not elsewhere classified	2.5.0.0		

TABLE 3
VEHICULAR CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code #	POLICE CODING CATEGORIES	MV104 code #
VEHICULAR FACTORS	3.0.0.0		
Tires and wheels	3.1.0.0	Tire Failure	47
Braking system	3.2.0.0	Brakes Defective	41
Steering system	3.3.0.0	Steering Failure	45
Suspension system	3.4.0.0	Suspension Defective	52
Power train	3.5.0.0	Engine Failure	51
Exhaust system	3.6.0.0		
Communication/electrical system	3.7.0.0	Headlights Defective/Out	42
		Brake Lights Out	43
		Turn Signal Defective	44
Failure of other body components	3.8.0.0		
Restraint system	3.9.0.0	Restraint System	53
Vehicle defect not associated with normal use	3.10.0		
manufacture-related defect or problem	3.10.1		
repair or maintenance problem	3.10.2		
inadequate vehicle safety standards	3.10.3		
other vehicle defect	3.10.4	Windshield Defective	50
Vehicle-load factors	3.11.0	Insecure Load	54
Other vehicular factors	3.12.0	Accelerator Defective	40
		Oversize Vehicle	45
		Tow Hitch Failure	48
		Vehicle Driverless	49
		Dangerous Goods	55

TABLE 4

HUMAN-ENVIRONMENTAL CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code #	POLICE CODING CATEGORIES	MV104 code #
HUMAN-ENVIRONMENTAL	4.0.0.0		
Sensory and Perceptual factors	4.1.0.0	Visibility Impaired	65
Ambient, atmospheric conditions	4.1.1.0		
Roadway-related view obstruction	4.1.2.0		
camouflage effect	4.1.2.1		
roadway-topography/configuration	4.1.2.2		
roadside features	4.1.2.3		
other road-related view obstruction	4.1.2.4		
Vehicular-related view obstructions	4.1.3.0		
parked or stopped traffic	4.1.3.1		
vehicle-generated reduced visibility	4.1.3.2		
other veh.-related view obstruction	4.1.3.3		
Other visual interference	4.1.4.0		
glare (sunlight)	4.1.4.1	Glare/Sun	62
glare (artificial light)	4.1.4.2	Glare/Artificial	61
other visual interference	4.1.4.3		
Auditory interference	4.1.5.0		
Ambient light conditions	4.1.6.0		
Other sensory and perceptual factors	4.1.7.0		
Attentional factors	4.2.0.0		
Inattention	4.2.1.0		
Inadequate look-out	4.2.2.0		
Misdirected attention	4.2.3.0		
Distraction	4.2.4.0		
Trance-like state	4.2.5.0		
Interpretation/evaluation of information	4.3.0.0		
False assumption - behaviour of others	4.3.1.0		
False assumption - traffic control device	4.3.2.0		
Inaccurate distance-time estimate	4.3.3.0		
Overfamiliarity	4.3.4.0		
Underfamiliarity	4.3.5.0		
Other interpretation/evaluation	4.3.6.0		

TABLE 4 cont'. HUMAN-ENVIRONMENTAL CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code #	POLICE CODING CATEGORIES	MV104 code #
Decision-making factors	4.4.0.0		
Insufficiently defensive driving	4.4.1.0		
Insufficient communication	4.4.2.0		
Indecision	4.4.3.0		
Inadequate evasive maneuver	4.4.4.0		
Risk-taking	4.4.5.0		
Improper and illegal driving actions	4.4.6.0		
driving in excess of speed limit	4.4.6.1	Unsafe Speed	31
driving too fast for conditions	4.4.6.2		
failure to yield right-of-way	4.4.6.3	Failure to Yield	18
traffic control device ignored	4.4.6.4	Traffic Control Device Ignored	29
improper passing	4.4.6.5	Improper Passing	21
driving on wrong side of road	4.4.6.6	Driving on Wrong Side of Road	24
following too close	4.4.6.7	Following too Closely	20
improper turn	4.4.6.8	Turning Improperly	30
careless driving	4.4.6.9	Driving Without Due Care	13
other violations	4.4.6.10	Backing Unsafely	11
		Cutting In	12
		Failure to Signal	17
		Officer/Flagman/Guard Ignored	32
Pedestrian action	4.4.7.0	Pedestrian Error/Confusion	25
pedestrian walking on roadway	4.4.7.1		
pedestrian lying on roadway	4.4.7.2		
pedestrian darting onto road	4.4.7.3		
pedestrian jaywalking	4.4.7.4		
other pedestrian action	4.4.7.5		
Other decision-making factors	4.4.8.0		
Driving Inexperience	4.5.0.0	Driver Inexperience	14
Deliberate Intent	4.6.0.0		
Confirmed suicide	4.6.1.0	Suicide Attempt (Confirmed)	28
Suspected suicide	4.6.2.0		
Murder or manslaughter	4.6.3.0		
Other deliberate intent	4.6.4.0		
Other Human-Environmental	4.7.0.0		

TABLE 5

HUMAN-VEHICULAR CAUSAL FACTORS: TIRF CODES, POLICE (MV014) CODES

TIRF CODING CATEGORIES	TIRF code #	POLICE CODING CATEGORIES	MV104 code #
HUMAN-VEHICULAR FACTORS	5.0.0.0		
Operational Skill Factors	5.1.0.0		
Vehicle inexperience	5.1.1.0		
Vehicle unfamiliarity	5.1.2.0		
Inability to perform emergency maneuvers	5.1.3.0		
Other operational skill	5.1.4.0		
Performance Factors	5.2.0.0		
Loss of control	5.2.1.0		
Overcompensation	5.2.2.0		
Operator control actions	5.2.3.0		
braking	5.2.3.1		
acceleration	5.2.3.2		
steering	5.2.3.3		
gear-shifting	5.2.3.4		
other operator control	5.2.3.5		
Vehicle preparation and maintenance	5.3.0.0		
Vehicle modification	5.4.0.0	Vehicle Modification	60
Other Human-Vehicular	5.5.0.0		

TABLE 6

VEHICULAR-ENVIRONMENTAL CAUSAL FACTORS: TIRF CODES, POLICE (MV104) CODES

TIRF CODING CATEGORIES	TIRF code	POLICE CODING CATEGORIES	MV104 code #
VEHICULAR-ENVIRONMENTAL FACTORS	6.0.0.0		
Vehicle-road interaction (reduced traction)	6.1.0.0		
Hydroplaning	6.1.1.0		
Other vehicle-road interaction	6.1.2.0		
Vehicle-road interaction (other dynamics)	6.2.0.0		
Aerodynamics	6.3.0.0		
Other vehicular-environmental factors	6.4.0.0		

TABLE 7
MOST FREQUENTLY CITED POLICE (MV104) CONTRIBUTING FACTORS TO FATAL ACCIDENTS BRITISH COLUMBIA, 1984.

AS PRIMARY CAUSE	AS OTHER CAUSE	AS ANY CAUSE
Alcohol Involvement (42%)	Unsafe Speed (23%)	Alcohol Involvement (26%)
Driving Without Due Care (15%)	Driving Without Due Care (18%)	Unsafe Speed (18%)
Unsafe Speed (12%)	Alcohol Involvement (11%)	Driving Without Due Care (16%)
Wrong Side of Road (6%)	Wrong Side of Road (8%)	Wrong Side of Road (7%)
Failure to Yield Right of Way (5%)	Weather (8%)	Weather (6%)
Weather (4%)	Pedestrian Error/ Confusion (5%)	Failure to Yield Right of Way (4%)
Driver Inexperience (2%)	Failure to Yield Right of Way (3%)	Pedestrian Error/ Confusion (3%)
Officer/Flagman/Guard Ignored (2%)	Driver Inexperience (3%)	Driver Inexperience (2%)
Improper Passing (1%)	Fell Asleep (3%)	Visibility Impaired (2%)
Illness (1%)	Traffic Control Device Ignored (2%)	Traffic Control Device Ignored (1%)
Pedestrian Error/ Confusion (1%)	Improper Passing (2%)	Road Maintenance/ Construction (1%)
Improper Turn (1%)	Wild Animal (2%)	Improper Turn (1%)
Extreme Fatigue (1%)		Extreme Fatigue (1%)
		Brakes Defective (1%)

NOTE: Numbers in parentheses () represent the percentage of total citations of cause within the column category.

TABLE 8
MOST FREQUENTLY CITED CORONER DATA CONTRIBUTING FACTORS TO FATAL ACCIDENTS BRITISH COLUMBIA, 1984.

AS CORONER CAUSAL STATEMENT	AS TIRF INFERENCE CAUSE	AS ANY CAUSE
Alcohol (29%)	Loss of Control (16%)	Alcohol (16%)
Driving in Excess of Speed Limit (7%)	Alcohol (11%)	Loss of Control (13%)
Loss of Control (7%)	Driving in Excess of Speed Limit (8%)	Driving in Excess of Speed Limit (7%)
Ice/Snow/Slush on Road (5%)	Reduced Traction-other (3%)	Ice/Snow/Slush on Road (3%)
Ambient Atmospheric Conditions (4%)	Inattention (3%)	Pedestrian Walking on Roadway (2%)
Pedestrian Walking on Roadway (3%)	Driving on Wrong Side of Road (3%)	Inattention (2%)
Tires and Wheels (3%)	Pedestrian Walking on Roadway (2%)	Ambient Atmospheric Conditions (2%)
Water on Road (3%)	Traffic Control Device Ignored (2%)	Reduced Traction-other (2%)
Other Pedestrian Action (2%)	Braking System (2%)	Water on Road (2%)
Heart Attack (2%)	Camouflage Effect (2%)	Tires and Wheels (2%)
Fatigue (2%)	Inadequate Look-Out (2%)	Driving on Wrong Side of Road (2%)
Driving too Fast for Conditions (2%)	Careless Driving (2%)	Careless Driving (2%)
	Ice/Snow/Slush on Road (2%)	Other Pedestrian Action (2%)
	Water on Road (2%)	

NOTE: Numbers in parentheses () represent the percentage of total citations of cause within the column category.

TABLE 9
45 CAUSES OF FATAL TRAFFIC ACCIDENTS

	TIRF CODE
Fell asleep	1.1.1.0
Acute medical condition (eg. heart attack)	1.1.2.0
Pre-existing physical disability	1.2.1.1
Illness	1.2.1.2
Emotional/upset state	1.2.2.3
Fatigue	1.2.3.0
Alcohol	1.3.1.0
Drugs (illegal)	1.3.4.0
Road/intersection design	2.1.1.1
Deficient signing	2.1.1.3
Road Maintenance/construction	2.1.2.0
Water on road	2.2.1.0
Ice/snow/slush on road	2.2.2.0
Stopped vehicle on road	2.3.2.0
Obstruction/debris on road	2.3.3.0
Weather	2.3.6.0
Tire defect/failure	3.1.0.0
Brake defect/failure	3.2.0.0
Steering defect/failure	3.3.0.0
Electrical defect/failure (eg. lights)	3.7.0.0
Inadequate vehicle safety standards	3.10.3
Visibility impaired	4.1.0.0
Inattention	4.2.1.0
Distraction	4.2.4.0
False assumption-behaviour of others	4.3.1.0
Insufficient defensive driving	4.4.1.0
Indecision	4.4.3.0
Risk-taking	4.4.5.0
Driving in excess of speed limit	4.4.6.1
Driving too fast for conditions	4.4.6.2
Failure to yield right-of-way	4.4.6.3
Traffic control device ignored (eg. red light)	4.4.6.4
Improper passing	4.4.6.5
Driving on wrong side of road	4.4.6.6
Turning improperly	4.4.6.8
Driving without due care	4.4.6.9
Officer/flagman/guard ignored	4.4.6.10
Pedestrian walking on road	4.4.7.1
Pedestrian lying on road	4.4.7.2
Pedestrian jaywalking	4.4.7.4
Pedestrian other action	4.4.7.5
Driver inexperience	4.5.0.0
Suicide	4.6.1.0
Vehicle unfamiliarity	5.1.2.0
Loss of control	5.2.1.0

The sum of the coroner data citations for "improper and illegal driving actions:" (TIRF code 4.4.6.0) as percentages of the total number of citations within each category was: 12% for direct coroner statement, 17% for TIRF inference, and 15% overall. The comparable MV104 percentages for the "improper and illegal driving actions" listed in TIRF codes 4.4.6.1 to 4.4.6.10 (see Table 4) were: 42% as primary cause, 58% as other cause and 49% as any cause.

Finally, Table 9 lists, in TIRF code order, the 45 most frequently cited causes of fatal traffic accidents combining both the coroner and police (MV104) data sets. This list includes all causes cited at 0.5% frequency or more.

DISCUSSION

From these results it would appear that the police and the coroners view fatal traffic accidents from different perspectives. The police more frequently attribute accident cause to negligence on the part of the driver, while the coroner describes accident causes more in terms of the surrounding circumstances such as weather-related and vehicle-related causes. For example, 42% of the police primary cause citations involved "improper and illegal driving behaviours" as defined by the TIRF codes 4.4.6.1 to 4.4.6.10, while only 12% of the coroners' statements on accident cause fell into this category. In addition, 42% of the police primary cause citations and only 29% of the coroners' statements on cause involved alcohol, 1% of the police primary cause and 8% of the coroners' statements on cause involved pedestrian actions and so on.

Arguably, some portion of the apparent difference between the two data sets comes from the fact that the police are using pre-set coding categories, while the coroner uses written text. Further, the police probably have more of a legal-offence oriented point of view, which may tend to bias their perceptions. On the other hand, the police have over ten times the experience in investigating traffic accidents as does the coroner's office, and will probably be the first investigators at the scene of the accident, both of which would lend reliability if not validity to their accident investigation reports.

The problem that faces policy makers in this area centers around how to allocate limited policing and traffic safety education funds if the extent of specific fatal accident causes is not known. To illustrate, a campaign aimed at educating pedestrians may not rate a high priority if only 1% of the fatal accidents have as their cause pedestrian fault, but if the magnitude of the problem is closer to 10% of all fatal traffic accidents, then pedestrian-oriented education and enforcement programs become more important. Similarly, the difference between 29% and 42% alcohol-related would have policy implications.

Clearly, what is needed is a more shared accident investigation and report protocol. Indeed, <u>any</u> formalized fatal accident protocol for coroners' use would aid in the standardization of data collection and thus would increase the reliability of these reports. Pursuant to this end, one approach would be to present both the police and the coroner investigating a fatal traffic accident with a list of proven causes of these accidents as found

in Table 9. For example, each investigating group could then chose primary, secondary, and tertiary causes from this list (with the addition of an "other, explain" category), and then any discrepancies between the causal factors would warrant further consultation between the groups.

CONCLUSIONS

A comparison of police (MV104) and coroner reports on the causes of fatal traffic accidents in British Columbia in 1984 revealed substantial differences between the two data sets. Generally, the police portrayed these accidents as primarily the driver's fault, in terms of dangerous and illegal driving behaviours, with a high proportion of the accidents being alcohol-related. On the other hand, coroners' reports tended to characterize these fatalities as more of a product of circumstances, less as the driver's fault, and less as a consequence of alcohol impairment.

As the police have more experience in accident investigation and have standardized accident investigation protocols and forms, it is likely their data are more reliable than the coroners' written text. However, the difference between these two perspectives needs further investigation. Consequently it is recommended that similar fatal accident protocols and forms be developed for each group so that their perceptions of fatal traffic accident causes can be more accurately compared and agreement on the probable causes achieved.

Coroner and Police (MV104) Accident Cause Frequencies
British Columbia, 1984

APPENDIX A

Motor Vehicle Act Section 61
Police Traffic Accident Report Form (MV104)

MOTOR VEHICLE ACT
[S.211.1(1)(y),(z) and (aa) and bracketed words in (2) not in force, amendments not in force]

CHAPTER 288

Accident reports

61. (1) Where a vehicle driven or operated on a highway, either directly or indirectly, causes death or injury to a person or damage to property causing aggregate damage apparently exceeding $400, the person driving or in charge of the vehicle shall report the incident to a police officer or to a person designated by the superintendent to receive those reports, and shall furnish the information respecting the incident required by the police officer or designated person.

(2) Where the incident occurred

(a) in a city or city municipality the report shall be made to a police officer of the city or city municipality, or to the designated person, as soon as possible and in every case within 24 hours after the incident;

(b) in a municipality other than a city or city municipality the report shall be made to a police officer of the municipality, or to the designated person, as soon as possible and in every case within 24 hours after the incident; or

(c) elswhere than in a city, city municipality or municipality the report shall be made to the officer or constable of the Royal Canadian Mounted Police stationed nearest to the place where the incident occurred within 48 hours after the incident.

(3) Where a person required to make a report under subsection (1) is incapable of making the report, and

(a) there was another occupant of the vehicle at the time of the incident capable of making the report, that occupant shall make the report; or

(b) there was no other occupant capable of making the report, the investigating officer shall make the report.

(4) The person receiving a report under this section shall secure from the person making it, or by other inquiries where necessary, the particulars of the incident, the persons

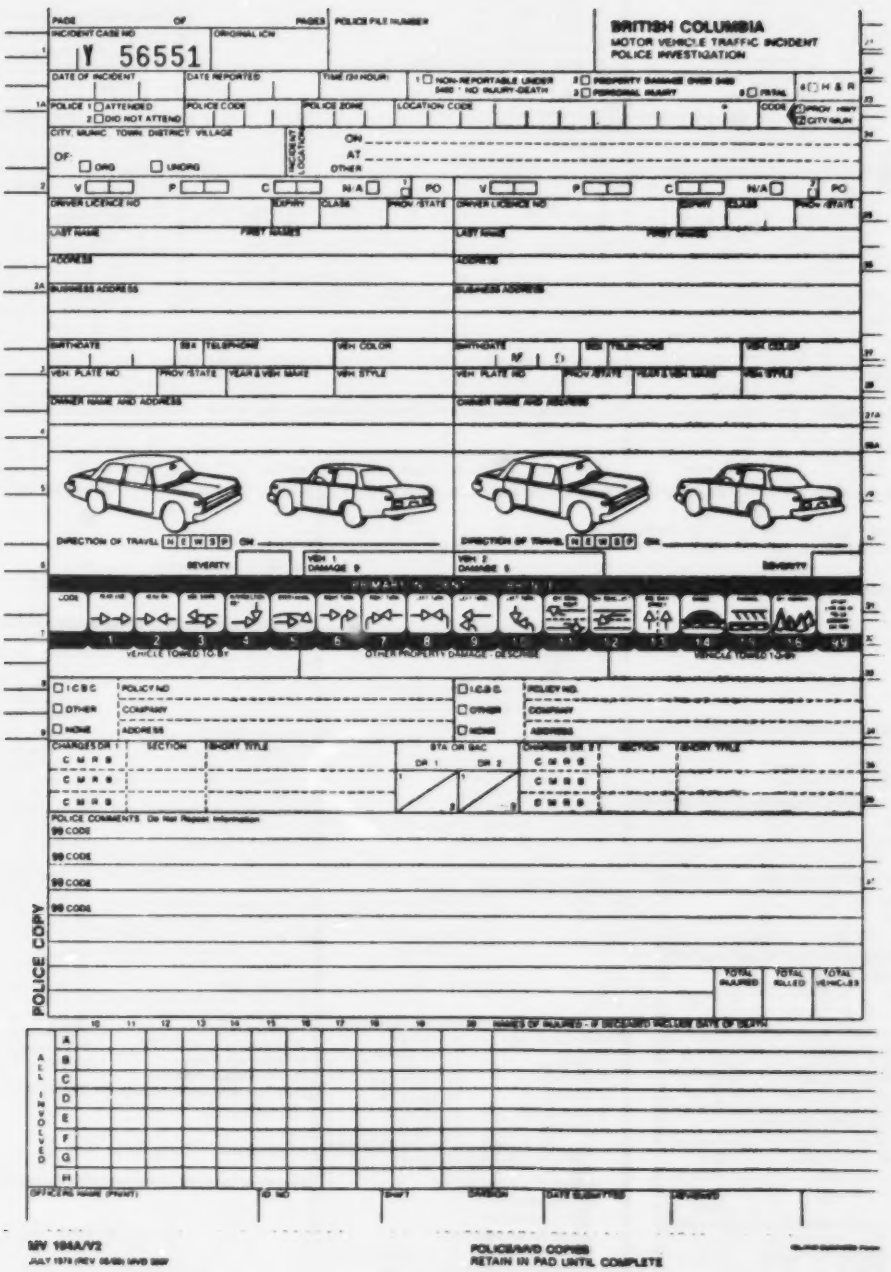
involved, the extent of the personal injury or property damage and other information necessary to complete a written report of the incident, and shall forward the written report to the superintendent within 10 days after being advised of the incident.

(5) The written report referred to in subsection (4) shall be in a form established by the superintendent.

(6) Every report made under this section is without prejudice and for the information of the superintendent and the municipal or Royal Canadian Mounted Police, and shall not be open to public inspection, except that a person involved in an incident, or his authorized representative, is entitled to obtain on request the names of any drivers involved, the licence number, the name of the registered owner of any motor vehicle involved and the name of any witness.

(7) The fact a report has been made under this section is admissible in evidence solely to prove compliance with this section, and the report is admissible in evidence on the prosecution of any person for the offence of making a false statement therein, but neither the report nor any statement contained in it is admissible in evidence for any other purpose in a trial or proceeding arising out of the incident referred to in the report.

(8) Notwithstanding subsections (6) and (7), a peace officer may, where giving evidence in a proceeding, refer to a report prepared by him under this section to refresh his memory.



BRITISH COLUMBIA
MOTOR VEHICLE TRAFFIC INCIDENT
POLICE INVESTIGATION

INCIDENT CASE NO: Y 56551

POLICE COPY

MV 184A/V2
JULY 1979 (REV. 05/83) MVD 3997

POLICE/MVD COPIES
RETAIN IN PAD UNTIL COMPLETE

1 ROAD CLASS
1—One lane
2—Two lane
3—Three lane
4—Four lane
5—Five lane
6—Six lane
1. Undivided
2. Divided
3. Ramp
1A TRAFFIC FLOW
01 One-way traffic
02 Two-way traffic
2 INCIDENT LOCATION
01 At intersection
02 Between intersection/exchanges
03 Intersection of road & driveway or alley
04 Bridge
05 Ferry or dock
06 Tunnel
07 Exit deceleration lane
08 Exit ramp
09 Exit intersection
10 Entrance acceleration lane
11 Entrance ramp
12 Entrance intersection
13 Off highway
14 Parking lot single/multilevel
15 RR Crossing
16 Industrial Road
2A SPEED ZONES
1—Posted Speed
2—Advisory
3—Special
1—10Km/h
2—20 Km/h
3—30 Km/h
4—40 Km/h
5—50 Km/h
6—60 Km/h
7—70 Km/h
8—80 Km/h
9—90 Km/h
0—100 Km/h
3 LAND USAGE IN INCIDENT AREA
01 School/playground
02 Urban residential
03 Apartment residential
04 Business/shopping
05 Industrial/Manufacturing
06 Agricultural/undeveloped
07 Recreational/park/camping
08 Rural residential
4 ROAD TYPE
01 Asphalt
02 Gravel
03 Oiled gravel
04 Earth
05 Concrete
06 Brick/stone
5 TRAFFIC CONTROL
01 None
02 Stop sign
03 Yield sign
04 Officer/Flagman/School guard
05 Railroad crossing sign
OR
2—Traffic signal
3—Traffic signal with advance flashers
4—Flashing signal
A N D
1. Red
2 Amber
3 Green
6 ROADWAY CHARACTER
1—Straight
2—Single curve
3—Sharp curve
4—Switchback
5—Winding curves
6—Reverse curve
Horizontal
Vertical
1 Flat
2 Some grade
3 Steep grade
4 Hillcrest
5 Sag
7 ROADWAY SURFACE CONDITION
01 Dry
02 Wet
03 Muddy
04 Snow
05 Slush
06 Ice
8 WEATHER CONDITIONS
01 Clear
02 Cloudy
03 Raining
04 Snowing/Sleet
05 Hail
06 Fog
07 Smog/Smoke
08 Strong wind
9 LIGHTING CONDITIONS
01 Daylight
02 Dawn
03 Dusk
04 Dark/full illum.
05 Dark/no illum.
06 Dark/some illum
A INDICATE WHICH VEHICLE OCCUPIED
01 Veh. 1
02 Veh. 2
03 Veh. 3
20-29 Bicycle
30-39 Pedestrian
90 Other**
90 Witness
B POSITION IN/ON VEHICLE
01 Driver
02-07 Passengers
09-72 Passengers
08 Riding/hanging on outside
C SAFETY EQUIPMENT USED
01 Veh. not equipped
02 No restraint used
03 Lap belt only
04 Harness only
05 Lap & Harness
06 Air bag
07 Child Restraint
08 Helmet
09 No Helmet
D EJECTION FROM VEHICLE
01 Not ejected
02 Partially ejected
03 Ejected
AGE
SEX
10
11
12
13
14
15
16
TYPE OF INCIDENT COLLISION
01 Other motor vehicle
02 Motorcycle
03 Pedestrian
04 Bicycle
05 Animal
06 Railroad train
07 Street car/Trolley coach
08 All Terrain Vehicle
09 Moped (under 50cc)
20 Light support pole
21 Utility support pole
22 Guard Rail/Traffic Barrier
23 Crash Cushion/Impact Attenuator
24 Sign Post
25 Tree
26 Building/wall
27 Curbing
28 Fence
29 Bridge Deck or Parapet
30 Raised Traffic Island
31 Snow bank/Drift
32 Rock Face
33 Ditch
34 Culvert
35 Fire Hydrant
36 Rocks or Debris
40 Over turned
41 Fire/explosion
42 Submersion (lake, river, slough)
43 Ran off/left roadway
44 Runaway on Grade
90 Other Collision type Explain in Police Comment Section
SECOND EVENT
21
THIRD EVENTS
VEH. 1
22
VEH. 2
23
LOCATION OF FIRST CONTACT
01 On Roadway
02 Off Roadway
09 Unknown
24
PRE-COLLISION VEHICLE ACTION 1ST EVENT
01 Going straight ahead
02 Making right turn
03 Making left turn
04 Making "U" turn
05 Starting from parked position
06 Starting in traffic
07 Slowing or stopping
08 Stopped in traffic
09 Entering parked position
10 Parked legally
11 Parked illegally
12 Avoiding object on road
13 Changing lanes
14 Overtaking
15 Merging
16 Backing
17 Skidding
18 Swerving
19 Spinning
20 Jack knifing
21 Yaw
VEH. 1
VEH. 2
25
26
VEHICLE TYPE
01 Pass car
02 Car & Trailer
20 Single unit Trk/lt
21 Single unit Trk/hy
30 Comb unit trk/lt
31 Comb unit trk/hy
32 Comb unit tractor/tlr
33 Comb unit trac/tlr & pup
34 Log Trk & Pl Trl
40 Bus - School
41 Bus - Public
50 Motorcycle
51 Moped (50cc)
52 Bicycle
60 Truck/camper
61 Truck/camper and tlr
62 Motor home
63 Motor home/tlr
70 Trailer only
8—ATV (see list)
9—Special (see list)
VEH. 1
VEH. 2
27
28
VEHICLE USE
01 Not in use
02 Personal
03 Business/Commercial
04 Driver Training School
05 Recreational
06 Emergency
07 Military
08 Taxi
09 Farm use
11 Government
2—Dangerous Goods (see list)
VEH. 1
VEH. 2
27A
28A
29 PEDESTRIAN LOCATION
01 At intersection
02 Not at intersection
30 PEDESTRIAN ACTION
01 Crossing with signal
02 Crossing against signal
03 Crossing, no signal, marked crosswalk
04 Crossing, no signal, unmarked crosswalk
05 Walking along highway with traffic
06 Walking along highway against traffic
07 emerging from front/behind parked veh.
08 Adult getting on/off a vehicle
10 Pushing/working on a car
11 Working in roadway
12 Playing in roadway
13 Riding or hitching on a vehicle
14 Standing on sidewalk
APPARENT CONTRIBUTING FACTORS
10 Alcohol involvement
11 Backing unsafely
12 Cutting in
13 Driving without due care
14 Driver inexperience
15 Drugs (illegal)
16 Extreme fatigue
17 Failure to signal
18 Failure to yield right of way
19 Fell asleep
20 Following too closely
21 Improper passing
22 Illness (Explain)
23 Sudden loss of consciousness
24 Driving on wrong side of road
25 Pedestrians error/confusion
26 Pre-existing physical disability
27 Prescribed medication
28 Attempt at suicide (confirmed)
29 Traffic Control Device ignored
30 Turning improperly
31 Unsafe speed
32 Officer/Flagman/Guard ignored
40 Accelerator defective
41 Brakes defective
42 Headlights defective/out
43 Brake lights out
44 Turn signals defective
45 Oversize vehicle
46 Steering failure
47 Tires-failure/inadequate
48 Tow hitch failure
49 Vehicle driverless
50 Windshield defective
51 Engine failure
52 Suspension defect
53 Restraint system
54 Insecure Load
55 Dangerous Goods
60 Vehicle modification **Explain
61 Glare-artificial
62 Glare-sunlight
63 Obstruction/debris in road
64 Pavement surface defective
65 Visibility impaired
66 Weather
67 Road maintenance/construction
68 Previous traffic incident
69 Sign obstruction
70 Domesticated Animal
71 Wild Animal
72 Insufficient traffic control
73 Road/Intersection Design
74 Roadside Hazard
99 Other **Explain in Police Comments
VEH/BR. 1
VEH/BR. 2
31
32
33
34
35
36
LOCATION OF MOST SEVERE INJURY
01 No injury
02 Head
03 Face
04 Eye
05 Neck
06 Chest
07 Back
08 Shoulder-upper arm
09 Elbow-lower arm-hand
10 Abdomen-pelvis
11 Hip-upper leg
12 Knee-lower leg-foot
13 Entire body
TYPE OF INJURY
01 None
02 Abrasion
03 Bruises
04 Lacerations
05 Bleeding
06 Fracture
07 Dislocation
08 Burns
09 Amputations
10 Concussion
11 Drowning
12 Whiplash
STATE OF CONSCIOUSNESS
01 Apparently normal
02 Agitated
03 Incoherent
04 Semi-conscious
05 Unconscious
06 Apparently dead
07 Natural Cause Death
INJURED TAKEN
TO
BY
17
18
19
20
SPECIAL STUDY
IF APPLICABLE - PLACE DECAL HERE
37
IF DATA NOT PRESENT
USE CODE 99 AND EXPLAIN
IN POLICE COMMENTS

Coroner and Police (MV104) Accident Cause Frequencies British Columbia, 1984

APPENDIX B

Coroner's Act Sections 1, 3, 4, 9, 21, 22, 28
Judgement of Inquiry Form
Verdict of Inquest Form

CORONER'S ACT

[Ss. 7(2) and (3), 11, 18, 19 and 60 (1) not in force]

CHAPTER 68

Appointment of coroners

1. (1) The Lieutenant Governor in Council may appoint one or more coroners in and for the Province, or for any less extensive area that he thinks proper.

(2) A coroner ceases to hold office on attaining the age of 65; but the Lieutenant Governor in Council may extend the coroner's term for any period not beyond the date of his 70th birthday.

Appointment of chief coroner and powers

3. The Lieutenant Governor in Council may appoint a coroner to be chief coroner for British Columbia who shall

(a) administer this Act and the regulations;
(b) supervise, direct and control all coroners in the Province in the performance of their duties;
(c) conduct programs for the instruction of coroners in their duties;
(d) bring the findings and recommendations of coroners and coroner's juries to the attention of appropriate persons, agencies and ministries of government;
(e) prepare, publish and distribute a code of ethics for the guidance of coroners;
(f) perform other duties that are assigned to him under any other Act or regulations or by the Attorney General.

Appointment of regional coroners

4. (1) The Attorney General may designate a coroner to be a regional coroner who shall have, subject to the direction of the chief coroner, general supervision of te cororners within a region determined by the Attorney General and other powers and duties as may be determined by the Attorney General or by the chief coroner.

(2) A coroner to whom this section applies may exercise the powers and assume the duties conferred by this section in an y other region at the request of the coroner designated for that region, the Attorney General or the chief coroner.

(3) A designation under this section does not limit the jurisdiction throughout the Province of a coroner appointed with that jurisdiction.

Deaths to be reported

9. (1) A person shall immediately notify a coroner or a peace officer of the facts and circumstances relating to a death where he has reason to believe that a person died

(a) as a result of violence, misadventure, negligence, misconduct, malpractice, or suicide;
(b) by unfair means;
(c) during pregnancy or following pregnancy in circumstances that might reasonably be attributable to pregnancy;
(d) suddenly and unexpectedly;
(e) from disease, sickness or unknown cause, for which he was not treated by a medical practioner;
(f) from any cause other than disease under circumstances that may require investigation; or
(g) in a correctional institution, lockup or prison.

(2) The person in charge of an institution shall immediatley give notice to the coroner of the death of a person who dies

(a) while a resident of or an in-patient in a
    (i) community care facility under the Community Care Facility Act; or
    (ii) place for the examination, diagnosis, treatment or rehabilitation of metally disordered persons to which the Mental Health Act applies; or
    (iii) public or private hospital to which the person was transferred from a facility or place referred to in subparagraphs (i) and (ii); or
(b) while he is, whether or not on the premises or in actual custody, a patient of a place referred to in paragraph (a)(ii), or committed to a correctional centre, penitentiary or police lockup.

(3) Where a person dies while detained by or in the actual custody of a peace officer, the peace officer shall immediately notify the coroner.

(4) A peace officer who is notified under subsection (1) shall notify a coroner.

Inquiry without jury

21. (1) Where a death has occurred other than in a correctional centre, penitentiary or police lockup, or in a place or under circumstances that require an inquest under any other Act, the coroner, if he is satisfied that the circumstances surrounding the death plainly indicate that no inquest is necessary, instead of summoning a jury, may make an inquiry into the death of the deceased as he considers proper.

(2) On an inquiry the coroner shall view and identify the body and may, in his discretion, put into writing the statements on oath of any person willing to furnish information about circumstances surrounding the death.

(3) For purposes of the inquiry, the coroner may issue his order for the attendance as a witness before him of any medical practitioner who was in attendance on the deceased during his last illness, or who was at the time in actual practice in or near the place where the death happened.

(4) On completion of the inquiry the coroner shall forward to the chief coroner all depositions and statements in writing taken by him, together with his report on the results of the inquiry.

Where inquest required

22. If, before proceeding to make an inquiry without a jury under section 21, or in the course of holding the inquiry, there appears to the coroner, from the information furnished to him or from the opinion of any medical witness, to be any reason for summoning a
jury, the coroner may, and shall where there appears to him to be any reason to suspect that the deceased died by murder or manslaughter, proceed to summon a jury in the manner required by this Act.

Purpose of inquest

28. (1) Where an inquest is held, it shall inquire into and determine who the deceased was and how, when, where and by what means he died.

(2) The jury shall not make any finding of legal responsibility or express any conclusion of law on any matter referred to in subsection (1).

(3) Subject to subsection (2), the jury may make recommendations in respect of any matter arising out of the inquest.

(4) A finding that contravenes subsection (2) is improper and shall not be accepted by the coroner.

(5) Where a jury fails to deliver a proper finding is shall be discharged.

CORONER'S COURT OF BRITISH COLUMBIA
HELD AT B.C.

CASE NO

JUDGEMENT OF INQUIRY

Into The Death Of

SURNAME | GIVEN NAMES

Address:

I, ,a Coroner in the Province of British Columbia have inquired into the death of the above stated which was reported to me on the day of 19 and as a result of such inquiry have determined the following facts

Age Sex M ☐ F ☐ Native ☐

Date of Birth: Est. Date of Death:

Place of Death: Est. Time of Death:

Place of Injury/Illness: Date and Time:

Type of Premise: Code ☐

Identification Method: Visual ☐ Other:

Identification By:

Body Released to: Date:

POST MORTEM EXAMINATION: Yes ☐ No ☐ Date:

Conducted By:

TOXICOLOGY EXAMINATION: Yes ☐ No ☐ Date:

Conducted By:

Relevant Findings:

MEDICAL CAUSE OF DEATH

(1) Immediate Cause of Death (a) Code ☐

DUE TO or as a consequence of

Antecedent Cause if any (b) Code ☐

DUE TO or as a consequence of

Giving rise to the immediate cause (a) above Stating the underlying cause last (c)

(2) Other Significant Medical Causes Contributing to Death

Code ☐

BY WHAT MEANS: Code ☐

CLASSIFICATION OF THE EVENT: Natural ☐ Accidental ☐ Homicide ☐ Suicide ☐ Undetermined ☐

Dated this day of 19

Coroner

Case No

CORONER'S COURT OF BRITISH COLUMBIA
HELD AT B.C.

CIRCUMSTANCES and RECOMMENDATIONS as a RESULT of the INQUIRY
Into The Death Of

CORONER'S COURT OF BRITISH COLUMBIA

Case No.

HELD AT BC

VERDICT OF CORONER'S INQUEST

Into The Death Of

SURNAME GIVEN NAME

Address:

WE, THE JURY, having been duly sworn and serving at the inquest into the death of the above stated, on the

day of 19 , have determined the following facts:

Age: Sex M ☐ F ☐ Native ☐

Date of Birth: Est. Date of Death:

Place of Death: Est. Time of Death:

Place of Injury/Illness: Date and Time:

Type of Premise: Code

Identification Method Visual ☐ Other:

Identified By:

MEDICAL CAUSE OF DEATH: Code

(1) Immediate Cause of Death: (a)

DUE TO or as a consequence of

Antecedent Cause, if any, giving rise to the immediate cause (a) above Stating the underlying cause last. (b)

DUE TO or as a consequence of

(c)

(2) Other Significant Medical Causes Contributing to Death:

BY WHAT MEANS: Code

Classification: Natural ☐ Accidental ☐

Homicide ☐ Suicide ☐

Undetermined ☐

THE JURORS Signature of Jurors

_____ _____ Foreman

_____ _____

_____ _____

_____ _____

_____ _____

_____ _____

THIS VERDICT was received by me, , a Coroner

for British Columbia this day of 19 .

_____

Presiding Coroner

Case No.

CORONER'S COURT OF BRITISH COLUMBIA

HELD AT B.C.

FINDINGS and RECOMMENDATIONS as a RESULT of the INQUEST

Into The Death Of

Coroner and Police (MV104) Accident Cause Frequencies British Columbia, 1984

APPENDIX C

Tables C.1 to C.3 - Police MV104 Causes
Tables C.4 to C.9 - Coroner Data Causes
For Fatal Traffic Accidents, B.C., 1984

TABLE C.1

HUMAN CAUSAL FACTORS: PRIMARY CAUSE, OTHER CAUSES, TOTAL CAUSES

BRITISH COLUMBIA POLICE (MV104) DATA, 1984.

CAUSAL FACTORS	MV104 Data Code	Primary Cause		Other Causes		Total	
		# Times Factor Cited	% Total Primary Citations	# Times Factor Cited	% Total Other Citations	# Times Factor Cited	% Total Citations
HUMAN FACTORS (sum)		328	92.66%	335	82.92%	663	87.47%
Alcohol Involvement	10	150	42.37%	44	10.98%	194	25.59%
Backing Unsafely	11	3	0.85%			3	0.39%
Cutting In	12						
Driving Without Due Care	13	52	14.69%	73	18.07%	125	16.49%
Driver Inexperience	14	6	1.69%	12	2.97%	18	2.37%
Drugs (Illegal)	15	1	0.28%	4	0.99%	5	0.66%
Extreme Fatigue	16	4	1.13%	3	0.74%	7	0.92%
Failure to Signal	17						
Failure to Yield Right of Way	18	16	4.52%	13	3.22%	29	3.83%
Fell Asleep	19	3	0.85%	12	2.97%	15	1.98%
Following too Closely	20						
Improper Passing	21	5	1.41%	10	2.48%	15	1.98%
Illness	22	5	1.41%	1	0.25%	6	0.79%
Sudden Loss of Consciousness	23	1	0.28%	1	0.25%	2	0.26%
Driving on Wrong Side of Road	24	21	5.93%	33	8.17%	54	7.12%
Pedestrian Error/Confusion	25	4	1.13%	19	4.70%	23	3.03%
Pre-existing Physical Disability	26	1	0.28%	3	0.74%	4	0.53%
Prescribed Medication	27			1	0.25%	1	0.13%
Attempt at Suicide (Confirmed)	28	3	0.85%	1	0.25%	4	0.53%
Traffic Control Device Ignored	29			10	2.48%	10	1.32%
Turning Improperly	30	4	1.13%	3	0.74%	7	0.92%
Unsafe Speed	31	43	12.15%	92	22.77%	135	17.81%
Officer/Flagman/Guard Ignored	32	6	1.69%			6	0.79%

TABLE C.2
VEHICULAR CAUSAL FACTORS: PRIMARY CAUSE, OTHER CAUSES, TOTAL CAUSES
BRITISH COLUMBIA POLICE (MV104) DATA, 1984.

CAUSAL FACTORS	MV104 Data Code	Primary Cause		Other Causes		Total	
		# Times Factor Cited	% Total Primary Citations	# Times Factor Cited	% Total Other Citations	# Times Factor Cited	% Total Citations
VEHICULAR FACTORS (sum)		5	1.41%	12	2.97%	17	2.24%
Accelerator Defective	40						
Brakes Defective	41	1	0.28%	6	1.49%	7	0.92%
Headlights Defective/Out	42			3	0.74%	3	0.39%
Brake Lights Out	43						
Turn Signals Defective	44						
Oversize Vehicle	45						
Steering Failure	46						
Tires-Failure/Inadequate	47	3	0.85%	3	0.74%	6	0.79%
Tow Hitch Failure	48						
Vehicle Driverless	49						
Windshield Defective	50						
Engine Failure	51	1	0.28%			1	0.13%
Suspension Defect	52						
Restraint System	53						
Insecure Load	54						
Dangerous Goods	55						
Vehicle Modification	60						

TABLE C.3
ENVIRONMENTAL CAUSAL FACTORS: PRIMARY CAUSE, OTHER CAUSES, TOTAL CAUSES
BRITISH COLUMBIA POLICE (MV104) DATA, 1984.

CAUSAL FACTORS	MV104 Data Code	Primary Cause		Other Causes		Total	
		# Times Factor Cited	% Total Primary Citations	# Times Factor Cited	% Total Other Citations	# Times Factor Cited	% Total Citations
ENVIRONMENTAL FACTORS (sum)		21	5.93%	57	14.11%	78	10.29%
Glare-Artificial	61			1	0.25%	1	0.13%
Glare-Sunlight	62	1	0.28%			1	0.13%
Obstruction/Debris on Road	63	1	0.28%	3	0.74%	4	0.53%
Pavement Surface Defective	64						
Visibility Impaired	65	2	0.56%	10	2.48%	12	1.58%
Weather	66	13	3.67%	33	8.17%	46	6.07%
Road Maintenance/Construction	67	1	0.28%	7	1.73%	8	1.06%
Previous Traffic Incident	68	1	0.28%	2	0.49%	3	0.39%
Sign Obstruction	69						
Domesticated Animal	70	2	0.56%	1	0.25%	3	0.39%
Wild Animal	71						
Insufficient Traffic Control	72						
Road/Intersection Design	73						
Roadside Hazard	74						
Other- Any Other Factor: Human, Vehicular or Environmental	99						

TABLE C.4
HUMAN CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
HUMAN FACTORS (sum)	1.0.0.0	129	36.24%	126	15.80%	255	22.12%
Critical Nonperformance (sum)	1.1.0.0	11	3.09%	16	2.01%	27	2.34%
States of Sleep	1.1.1.0	2	0.56%	11	1.38%	13	1.13%
Acute Medical Condition (sum)	1.1.2.0	8	2.25%	4	0.50%	12	1.04%
seizure	1.1.2.1						
heart attack	1.1.2.2	7	1.97%	2	0.25%	9	0.78%
stroke	1.1.2.3						
other acute medical	1.1.2.4	1	0.28%	2	0.25%	3	0.26%
Other critical nonperformance	1.1.3.0	1	0.28%	1	0.12%	2	0.17%
Psychomotor Capability (sum)	1.2.0.0	11	3.09%	19	2.38%	30	2.60%
Physical Factors (sum)	1.2.1.0	3	0.84%	8	1.00%	11	0.95%
physical handicap	1.2.1.1	1	0.28%			1	0.09%
medical condition	1.2.1.2			3	0.38%	3	0.26%
sensory deficiency (vision, hearing)	1.2.1.3	2	0.56%	3	0.38%	5	0.43%
physical interruptions (eg. sneezing)	1.2.1.4			1	0.12%	1	0.09%
other physical factors	1.2.1.5			1	0.12%	1	0.09%
Mental Factors (sum)	1.2.2.0	1	0.28%	9	1.13%	10	0.87%
mental condition/state	1.2.2.1			2	0.25%	2	0.17%
mental attributes	1.2.2.2	1	0.28%	1	0.12%	2	0.17%
emotional upset/state	1.2.2.3			4	0.50%	4	0.35%
other mental factors	1.2.2.4			2	0.25%	2	0.17%
Fatigue	1.2.3.0	7	1.97%	2	0.25%	9	0.78%
Other psychomotor	1.2.4.0						

TABLE C.4 cont'
HUMAN CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
Alcohol, Other Drugs and Substances (sum)	1.3.0.0	107	30.06%	91	11.42%	198	17.17%
Alcohol	1.3.1.0	104	29.21%	84	10.54%	188	16.30%
Canabis	1.3.2.0			4	0.50%	4	0.35%
Prescription or Over-the-Counter Drugs	1.3.3.0	1	0.28%	2	0.25%	3	0.26%
Illegal Drugs	1.3.4.0	2	0.56%	1	0.12%	3	0.26%
Other Drugs and Substances	1.3.5.0						
Other human condition, attribute, or state not specifically classified above	1.4.0.0						

TABLE C.5
ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Overall	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
ENVIRONMENTAL FACTORS (sum)	2.0.0.0	46	12.92%	71	8.91%	117	10.15%
Highway Factors (sum)	2.1.0.0	12	3.37%	18	2.26%	30	2.60%
Design and/or construction of hwy. and components (sum)	2.1.1.0	10	2.81%	9	1.13%	19	1.65%
roadway/intersection design	2.1.1.1	5	1.40%	2	0.25%	7	0.61%
improperly banked curves	2.1.1.2	1	0.28%	2	0.25%	3	0.26%
deficient signing	2.1.1.3	3	0.84%	4	0.50%	7	0.61%
deficient traffic control	2.1.1.4						
other highway design	2.1.1.5	1	0.28%	1	0.12%	2	0.17%
Highway maintenance (sum)	2.1.2.0	2	0.56%	8	1.00%	10	0.87%
road surface damage/irregularity	2.1.2.1			1	0.12%	1	0.09%
drop-offs at pavement edge	2.1.2.2						
road shoulders	2.1.2.3	1	0.28%	4	0.50%	5	0.43%
excessive road crowns	2.1.2.4						
road surface upkeep (winter)	2.1.2.5			3	0.38%	3	0.26%
road surface upkeep/clearance (other)	2.1.2.6						
damage/disrepair signs, signals etc.	2.1.2.7						
other highway maintenance	2.1.2.8	1	0.28%			1	0.09%
Other highway structure	2.1.3.0			1	0.12%	1	0.09%
Road Surface Factors (sum)	2.2.0.0	28	7.87%	34	4.27%	62	5.38%
Water on road	2.2.1.0	9	2.53%	14	1.76%	23	1.99%
Ice/snow/slush on road	2.2.2.0	19	5.34%	15	1.88%	34	2.95%
Other material on paved road surface	2.2.3.0			2	0.25%	2	0.17%
"Polished" smooth road surface	2.2.4.0						
Unpaved road	2.2.5.0			3	0.38%	3	0.26%
Other road surface	2.2.6.0						

TABLE C.5 cont'

ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL

BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
Transitory Hazards (sum)	2.3.0.0	6	1.69%	15	1.88%	21	1.82%
Animal on road	2.3.1.0			4	0.50%	4	0.35%
Stopped vehicle on road	2.3.2.0	3	0.84%	4	0.50%	7	0.61%
Other object(s) on road	2.3.3.0			1	0.12%	1	0.09%
Unidentified vehicle involvement	2.3.4.0			3	0.38%	3	0.26%
"Acts of God"	2.3.5.0						
Weather-related factors (sum)	2.3.6.0	3	0.84%	3	0.38%	6	0.52%
storm conditions	2.3.6.1	1	0.28%	2	0.25%	3	0.26%
fog	2.3.6.2	2	0.56%			2	0.17%
wind	2.3.6.3			1	0.12%	1	0.09%
other weather-related	2.3.6.4						
Evasive Route Obstructions - the absence of roadway space adequate for the performance of evasive driving maneuvers (either emergency or non-emergency). eg. traffic stopped on road shoulder, trees, fixed objects interrupting continuous road shoulder, narrow bridge.	2.4.0.0			4	0.50%	4	0.35%
Other - any other environmental factor not elsewhere classified	2.5.0.0						

TABLE C.6
VEHICULAR CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
VEHICULAR FACTORS (sum)	3.0.0.0	21	5.90%	39	4.89%	60	5.20%
Tires and wheels	3.1.0.0	10	2.81%	10	1.25%	20	1.73%
Braking system	3.2.0.0	2	0.56%	15	1.88%	17	1.47%
Steering system	3.3.0.0	2	0.56%	3	0.38%	5	0.43%
Suspension system	3.4.0.0	1	0.28%	1	0.12%	2	0.17%
Power train	3.5.0.0			1	0.12%	1	0.09%
Exhaust system	3.6.0.0						
Communications/electrical system	3.7.0.0	1	0.28	1	0.12%	2	0.17%
Failure of other body components	3.8.0.0	1	0.28%	1	0.12%	2	0.17%
Restraint system	3.9.0.0						
Vehicle defect not associated with normal use(sum)	3.10.0	2	0.56%	4	0.50%	6	0.52%
manufacture-related defect or problem	3.10.1						
repair or maintenance problem	3.10.2						
inadequate vehicle safety standards	3.10.3	2	0.56%	4	0.50%	6	0.52%
other vehicle defect	3.10.4						
Vehicle-load factors	3.11.0	2	0.56%	3	0.38%	5	0.43%
Other vehicular factors	3.12.0						

TABLE C.7
HUMAN-ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
HUMAN-ENVIRONMENTAL (sum)	4.0.0.0	125	35.11%	351	44.04%	476	41.28%
Sensory and Perceptual factors (sum)	4.1.0.0	25	7.02%	47	5.90%	72	6.24%
Ambient, atmospheric conditions	4.1.1.0	13	3.65%	13	1.63%	26	2.25%
Roadway-related view obstruction (sum)	4.1.2.0	5	1.69%	19	2.38%	25	2.17%
camouflage effect	4.1.2.1	2	0.56%	15	1.88%	17	1.47%
roadway-topography/configuration	4.1.2.2	2	0.56%	2	0.25%	4	0.35%
roadside features	4.1.2.3	2	0.56%	2	0.25%	4	0.35%
other road-related view obstruction	4.1.2.4						
Vehicular-related view obstructions (sum)	4.1.3.0	4	1.12%	5	0.62%	9	0.78%
parked or stopped traffic	4.1.3.1	1	0.28%	4	0.50%	5	0.43%
vehicle-generated reduced visibility	4.1.3.2	1	0.28%			1	0.09%
other veh.-related view obstruction	4.1.3.3	2	0.56%	1	0.12%	3	0.26%
Other visual interference (sum)	4.1.4.0	1	0.28%	4	0.50%	5	0.43%
glare (sunlight)	4.1.4.1	1	0.28%	2	0.25%	3	0.26%
glare (artificial light)	4.1.4.2			2	0.25%	2	0.17%
other visual interference	4.1.4.3						
Auditory interference	4.1.5.0			1	0.12%	1	0.09%
Ambient light conditions	4.1.6.0	1	0.28%	4	0.50%	5	0.43%
Other sensory & perceptual factors	4.1.7.0			1	0.12%	1	0.09%

TABLE C.7 cont'
HUMAN-ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
Attentional factors (sum)	4.2.0.0	9	2.53%	49	6.15%	58	5.03%
Inattention	4.2.1.0	4	1.12%	23	2.89%	27	2.34%
Inadequate look-out	4.2.2.0	3	0.84%	15	1.88%	18	1.56%
Misdirected attention	4.2.3.0	2	0.56%	5	0.63%	7	0.61%
Distraction	4.2.4.0			5	0.63%	5	0.43%
Trance-like state	4.2.5.0			1	0.12%	1	0.09%
Interpretation/evaluation of information (sum)	4.3.0.0	6	1.69%	10	1.25%	16	1.39%
False assumption - behaviour of others	4.3.1.0	1	0.28%	6	0.75%	7	0.61%
False assumption - traffic control device	4.3.2.0						
Inaccurate distance-time estimate	4.3.3.0	3	0.84%			3	0.26%
Overfamiliarity	4.3.4.0						
Underfamiliarity	4.3.5.0	2	0.56%	3	0.38%	5	0.43%
Other interpretation/evaluation	4.3.6.0			1	0.12%	1	0.09%

TABLE C.7 cont'
HUMAN-ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
Decision-making factors (sum)	4.4.0.0	77	21.63%	238	29.86%	315	27.32%
Insufficiently defensive driving	4.4.1.0	1	0.28%	10	1.25%	11	0.95%
Insufficient communication	4.4.2.0	4	1.12%	7	0.88%	11	0.95%
Indecision	4.4.3.0	1	0.28%	5	0.63%	6	0.52%
Inadequate evasive maneuver	4.4.4.0	1	0.28%	9	1.13%	10	0.87%
Risk-taking	4.4.5.0	2	0.56%	11	1.38%	13	1.13%
Improper and illegal driving actions (sum)	4.4.6.0	41	11.52%	137	17.19%	178	15.44%
driving in excess of speed limit	4.4.6.1	24	6.74%	62	7.78%	86	7.46%
driving too fast for conditions	4.4.6.2	7	1.97%	7	0.88%	14	1.21%
failure to yield right-of-way	4.4.6.3	3	0.84%	4	0.50%	7	0.61%
traffic control device ignored	4.4.6.4	2	0.56%	16	2.01%	18	1.56%
improper passing	4.4.6.5			4	0.50%	4	0.35%
driving on wrong side of road	4.4.6.6			20	2.51%	20	1.73%
following too close	4.4.6.7			1	0.12%	1	0.09%
improper turn	4.4.6.8			8	1.00%	8	0.69%
careless driving	4.4.6.9	5	1.40%	15	1.88%	20	1.73%
other violations	4.4.6.10						
Pedestrian action (sum)	4.4.7.0	27	7.58%	58	7.28%	85	7.37%
pedestrian walking on roadway	4.4.7.1	11	3.09%	17	2.13%	28	2.43%
pedestrian lying on roadway	4.4.7.2			6	0.75%	6	0.52%
pedestrian darting onto road	4.4.7.3	3	0.84%	12	1.51%	15	1.30%
pedestrian jaywalking	4.4.7.4	5	1.40%	11	1.38%	16	1.39%
other pedestrian action	4.4.7.5	8	2.25%	12	1.51%	20	1.73%
Other decision-making factors	4.4.8.0			1	0.12%	1	0.09%

TABLE C.7 cont'

HUMAN-ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
Driving Inexperience	4.5.0.0	3	0.84%	4	0.50%	7	0.61%
Deliberate Intent (sum)	4.6.0.0	5	1.40%	3	0.38%	8	0.69%
Confirmed suicide	4.6.1.0	5	1.40%			5	0.43%
Suspected suicide	4.6.2.0			2	0.25%	2	0.17%
Murder or manslaughter	4.6.3.0						
Other deliberate intent	4.6.4.0			1	0.12%	1	0.09%
Other human-environmental factors	4.7.0.0						

TABLE C.8
HUMAN-VEHICULAR CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL.
BRITISH COLUMBIA CORONER'S DATA, 1984. N=385

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
HUMAN-VEHICULAR FACTORS (sum)	5.0.0.0	33	9.27%	173	21.71%	206	17.87%
Operational Skill Factors (sum)	5.1.0.0	3	0.84%	11	1.38%	14	1.21%
Vehicle inexperience	5.1.1.0			3	0.38%	3	0.26%
Vehicle unfamiliarity	5.1.2.0	3	0.84%	4	0.50%	7	0.61%
Inability to perform emergency maneuvers	5.1.3.0			1	0.12%	1	0.09%
Other operational skill	5.1.4.0			3	0.38%	3	0.26%
Performance Factors (sum)	5.2.0.0	29	8.15%	159	19.95%	188	16.30%
Loss of control	5.2.1.0	24	6.74%	130	16.31%	154	13.36%
Overcompensation	5.2.2.0	2	0.56%	8	1.00%	10	0.87%
Operator control actions (sum)	5.2.3.0	3	0.84%	21	2.63%	24	2.08%
braking	5.2.3.1			10	1.25%	10	0.87%
acceleration	5.2.3.2	2	0.56%	3	0.38%	5	0.43%
steering	5.2.3.3	1	0.28%	5	0.63%	6	0.52%
gear-shifting	5.2.3.4						
other operator control	5.2.3.5			3	0.38%	3	0.26%
Vehicle preparation and maintenance	5.3.0.0	1	0.28%	2	0.25%	3	0.26%
Vehicle modification	5.4.0.0						
Other vehicle preparation & maintenance	5.5.0.0			1	0.12%	1	0.09%

TABLE C.9
VEHICULAR-ENVIRONMENTAL CAUSAL FACTORS: CORONERS STATEMENT, TIRF INFERENCE, TOTAL
BRITISH COLUMBIA CORONER'S DATA, 1984.

CAUSAL FACTORS	TIRF Data Code	Coroner Statement		TIRF Inference		Total	
		# Times Factor Cited	% Total Coroner Citations	# Times Factor Cited	% Total TIRF Citations	# Times Factor Cited	% Total Citations
VEHICULAR-ENVIRONMENTAL FACTORS (sum)	6.0.0.0	2	0.56%	37	4.64%	39	3.38%
Vehicle-road interaction (reduced traction) (sum)	6.1.0.0	2	0.56%	36	4.52%	38	3.30%
Hydroplaning	6.1.1.0	1	0.28%	11	1.38%	12	1.04%
Other vehicle-road interaction	6.1.2.0	1	0.28%	25	3.14%	26	2.25%
Vehicle-road interaction (other dynamics)	6.2.0.0						
Aerodynamics	6.3.0.0			1	0.12%	1	0.09%
Other vehicular-environmental	6.4.0.0						

The Measurement of the Contribution of Alcohol to Fatal Traffic Accidents, British Columbia, 1984

SUMMARY

The relationships among police accident report data, coroner data and Blood Alcohol Content (BAC) levels is examined for a set of fatal traffic accidents. The problems with each data source are discussed and the first step in designing a system combining these sources is suggested.

The Measurement of the Contribution of Alcohol to Fatal Traffic Accidents, British Columbia, 1984.

Alcohol is a depressant which, when taken in sufficient quantity, can cause behaviours that would not otherwise occur. The extent to which the ingestion of alcohol produces these abnormal behaviours that lead, directly or indirectly, to a traffic accident is the extent to which alcohol is a contributor to that accident. From this it follows that the simple presence of alcohol must be distinguished from whether or not that presence contributed to causing behaviours, which in turn contributed to causing the accident, and that it would be incorrect to rely on toxicological evidence alone to infer alcohol as a causal factor in a traffic accident. Indeed, it is not impossible that, after an investigation, it was concluded that alcohol was not a contributing causal factor to the accident even though the driver had a high Blood Alcohol Content (BAC).

Nevertheless, the availability of toxicological reports on those involved in a fatal traffic accident is important in order to judge the causal role of alcohol in the accident. Further, toxicologies combined with the investigating police officers' accident report and the coroner's inquiry or inquest findings

could prove very useful in assessing the magnitude of the causal role of alcohol in fatal traffic accidents.

Consequently, it is the purpose of this paper to examine the relationships among police accident investigation reports, coroner reports and BAC toxicologies in order to begin to develop a rationale for measuring the contribution of alcohol to fatal traffic accidents.

METHOD

Police Accident Reports:

In British Columbia a police officer assigned to a traffic section investigates about 47 casualty traffic accidents per year (i.e. an accident where somebody is seriously injured or killed) and reports on these accidents using the Motor Vehicle Department Traffic Accident Report Form (MV104). This form has been used, with minor changes, by the police throughout the province since 1977. The provincial Motor Vehicle Act (section 61) requires the drivers in and witnesses to an accident to respond to questions pertaining to the accident, and to help elicit honest responses, the law states that their answers can not be used as evidence in court.

The MV104 itself consists of, among other things, a set of descriptors of accident causes from which the investigating team may choose primary, secondary, and tertiary causes of the accident for each driver in the accident.

Coroner Reports:

Coroners in B.C. are appointed by the Attorney General and, in the case of a fatal traffic accident, may conduct either an

inquiry or an inquest. Motor vehicle fatalities comprise about 40% of the 100 or so inquests per year in B.C. and about 6% of the approximately 8,000 inquiries carried out per year. As there are about 130 coroners in the province, it follows that, on the average, a B.C. coroner investigates about three traffic deaths per year and holds fewer than one traffic-related inquest per year. In these processes he completes a textual commentary on the accident, either in terms of an investigation or inquest form.

In addition, it is the coroner's responsibility to ensure that toxicologies are done on accident victims where appropriate and feasible.

Analyses:

The text from B.C. coroner investigation and inquest forms for 1984 was coded into computer-readable form by the Traffic Injury Research Foundation (TIRF) at Ottawa. For these analyses accidents were divided into three coroner-related groups: coroner stated alcohol was a causal factor; coroner stated some other causal factor(s) none of which were alcohol; coroner gave no judgement as to the accident cause.

Regarding the B.C. 1984 police accident investigations (MV104), for these analyses fatal accidents were coded into two groups: those where the police indicated that one or more drivers' alcohol consumption was a causal contributor to the accident; and those where the police indicated that there were other causal factors associated with the drivers, none of which were alcohol.

Blood Alcohol Content (BAC) toxicologies for drivers and pedestrians killed in traffic accidents in B.C. in 1984 were divided into five groups: no toxicology done; BAC .00-.05; BAC .051-.170; BAC .171-.240; BAC .240+. The divisions among the BAC levels was based on the need to maximize the number of persons in each group, while the BAC levels themselves were determined by the highest BAC reading for each victim.

Finally, crosstabulations among these three variable sets were produced for both accidents where drivers were killed and accidents where pedestrians were killed.

RESULTS AND DISCUSSION

Frequencies:

The police judged that 40% of the drivers in accidents where drivers were killed and 35% of drivers in accidents where pedestrians were killed were impaired to the extent that alcohol could be considered as a causal factor. The remaining accidents in each group were judged to have other causes, none of which was alcohol.

Regarding the coroner's judgement as to whether or not alcohol was a causal factor, in accidents where drivers were killed 30% were judged as having alcohol as a causal factor, 19% as alcohol not being a causal factor, and in 51% of the accidents the coroner gave no judgement as to the accident cause. The figures for accidents where pedestrians were killed were 11% alcohol, 27% not alcohol and 62% no opinion.

Driver BAC in accidents where drivers were killed had an average value of .117 with a standard deviation of .118. In 23%

of these accidents there was no toxicology done on the fatally injured drivers. The distribution of BAC levels was:

BAC	.000-.050	44%
BAC	.051-.170	20%
BAC	.171-.240	17%
BAC	.240+	18%

Blood Alcohol Content for fatally injured pedestrians averaged .119 with a standard deviation of .153. In 43% of the accidents there was no toxicology done on the fatally injured pedestrians. The distribution of BAC levels was:

BAC	.000-.050	60%
BAC	.051-.170	4%
BAC	.171-.240	9%
BAC	.240+	28%

Crosstabulations:

Table 1 represents a breakdown of fatal accident frequencies where one or more drivers were killed by: drivers BAC levels, coroner's judgement as to alcohol as a causal factor and the police judgement as to whether or not the alcohol impairment of the driver was a causal factor. Table 2 represents a breakdown of fatal accident frequencies where one or more pedestrians were killed by: pedestrian BAC levels, coroner's judgement as to alcohol as a causal factor, and the police judgement as to whether or not the alcohol impairment of the driver was a causal factor.

Driver Fatalities:

From Table 1 it can be seen that the police and coroner do not always agree on whether or not alcohol played a causal role in the accident: of the 84 accidents that the coroner judged alcohol to be a cause, the police disagreed on 26 (31%), while of

the 53 that the coroner judged alcohol not to be a cause, the police indicated that they felt it was a cause in 6 (11%).

The coroner's judgement as to cause seems to be closely tied into the toxicological evidence. For example, of the 63 fatalities where no toxicologies were performed, the coroner gave no opinion on the accident cause in 55 (87%), while of the 217 where toxicologies were performed, he made no judgement as to the accident cause in 88 (41%). On the other hand, the police are required to make a judgement as to the possible fault of drivers in all instances, toxicology or not.

Further, these data suggest that toxicologies are done more frequently when there is a suspicion of alcohol involvement (which in turn could bias the frequency distribution of the BAC levels in the direction of raising the average and raising the frequency of a positive BAC). To elaborate, the police judged alcohol as a cause in 20 of the 63 accidents where no toxicologies were performed (32%), and judged that it was a cause in 93 of the 217 accidents where toxicologies were performed (43%). That is, if the failure to obtain toxicologies was a random process, one would expect these two figures to coincide.

Pedestrian Fatalities:

Table 2 cannot be compared directly to Table 1, as it must be remembered that the police judgement as to alcohol as a cause relates to the driver, not the pedestrian, while the coroner judges the cause of the accident overall. Nevertheless, similar patterns emerge. The police and the coroner did not always agree, and the coroner made judgements as to cause more readily when toxicologies were performed.

TABLE 1

DRIVER TOXICOLOGY, CORONER JUDGEMENT AS TO ALCOHOL CAUSE, POLICE JUDGEMENT AS TO ALCOHOL CAUSE: DRIVER FATALITIES, BRITISH COLUMBIA, 1984. (N=280)

DRIVER'S BLOOD ALCOHOL CONTENT (BAC) GROUPINGS	CORONER'S JUDGEMENT: ALCOHOL WAS A CAUSE		CORONER'S JUDGEMENT: ALCOHOL WAS NOT A CAUSE		CORONER'S JUDGEMENT: NO OPINION	
	POLICE JUDGEMENT: DRIVER'S IMPAIRMENT WAS A CAUSE		POLICE JUDGEMENT: DRIVER'S IMPAIRMENT WAS A CAUSE		POLICE JUDGEMENT: DRIVER'S IMPAIRMENT WAS A CAUSE	
	YES	NO	YES	NO	YES	NO
NO TOXICOLOGY	1	0	0	7	19	36
.000 - .050	1	1	2	37	8	46
.051 - .170	14	10	3	2	9	7
.171 - .240	18	10	1	1	5	3
.240+	24	5	0	0	8	2

NOTE: Values represent the number of fatal accidents where one or more drivers were killed.

One interesting aspect of these data is that in the instances where toxicologies were performed on the pedestrians, 42% had a BAC of .051 or more, and of that group, 68% were struck by drivers that the police judged were impaired.

Towards a Resolution:

From the above it is clear that the overall causal contribution of alcohol to fatal traffic accidents is a matter of judgement, and that no single source of information can be taken as absolute. First, the toxicological evidence is incomplete and possibly biased. Further, the same BAC level will produce different levels of impairment in different drivers, and that impairment may or may not contribute causally to the accident. Second, the coroner judgement as to accident cause is infrequent enough that it cannot be used in any general statement of overall fatal accident causation. Third, the police judgement is specific to the driver (as opposed to all aspects of the accident) and is often made without the benefit of BAC evidence.

On the other hand, each of these sources of information is not without some merit. Perhaps what is needed is not an absolute, bimodal measure of alcohol yes vs. alcohol no, but rather a measure of alcohol involvement that suggests levels of certainty. For example, in an accident where there is a positive BAC, the police judge alcohol to be a cause and the coroner judges alcohol to be a cause, one might safely conclude that alcohol was in fact a cause of the accident. Using this notion (and assuming that every accident has about the same chance to have BAC evidence, a police judgement, and a coroner judgement) a

TABLE 2

PEDESTRIAN TOXICOLOGY, CORONER JUDGEMENT AS TO ALCOHOL CAUSE, POLICE JUDGEMENT AS TO ALCOHOL CAUSE: DRIVER FATALITIES, BRITISH COLUMBIA, 1984. (N=86)

PEDESTRIAN BLOOD ALCOHOL CONTENT (BAC) GROUPINGS	CORONER'S JUDGEMENT: ALCOHOL WAS A CAUSE		CORONER'S JUDGEMENT: ALCOHOL WAS NOT A CAUSE		CORONER'S JUDGEMENT: NO OPINION	
	POLICE JUDGEMENT: DRIVER'S IMPAIRMENT WAS A CAUSE		POLICE JUDGEMENT: DRIVER'S IMPAIRMENT WAS A CAUSE		POLICE JUDGEMENT: DRIVER'S IMPAIRMENT WAS A CAUSE	
	YES	NO	YES	NO	YES	NO
NO TOXICOLOGY	1	0	0	8	10	14
.000 - .050	1	0	1	13	2	14
.051 - .170	0	0	0	0	2	0
.171 - .240	0	1	0	1	2	1
.240+	5	2	0	0	6	2

NOTE: Values represent the number of fatal accidents where one or more pedestrians were killed.

scoring system could be devised to roughly classify accidents as to their likelihood of being caused by alcohol.

Using the data from Table 1, and giving an accident one point for each of (i) a judgement of alcohol by the police, (ii) a judgement of alcohol by the coroner, and (iii) a BAC over .05, the following distribution is produced:

0 points - 126 accidents - 45%
1 point - 45 accidents - 16%
2 points - 53 accidents - 19%
3 points - 56 accidents - 20%

From this, it might be suggested that about 39% of the accidents very probably had alcohol as a causal factor, 16% may have had alcohol as a causal factor, and 45% probably did not have alcohol as a causal factor.

The application of this approach to the pedestrian fatalities displayed in Table 2 yields the following:

0 points - 49 accidents - 57% probably not: 57%
1 point - 17 accidents - 20% maybe: 20%
2 points - 15 accidents - 17%
3 points - 5 accidents - 6%] very probably 23%

The point is, while the system described above is only a rough approach to judging the proportional involvement of alcohol as a cause of traffic accidents, the general principle of using multiple data sources and of assigning levels of probability to alcohol as a cause is arguably superior to trying to use any single data source to produce absolute statements on alcohol involvement.

Finally, no system of assessing the relative causal contribution of alcohol to fatal traffic accidents can be completely successful until toxicological evidence is more universally collected and coroners make more frequent judgements on the causes of these fatal accidents.

SECTION 4

TRAFFIC ACCIDENT EPIDEMIOLOGY

A Brief Comparison of Injury and Fatal Traffic Accidents for the First Half of 1985 with those for the First Half of 1986

Contributing Factors to Casualty Motor Vehicle Crashes, 1985

The Percentage of Injuries and Deaths Associated with Drinking Driving by Police Jurisdiction: British Columbia, 1985

Locations of Casualty Motor Vehicle Crashes, 1985

Types of Casualty Motor Vehicle Crashes in British Columbia, 1985

A Brief Comparison of Injury and Fatal Traffic Accidents for the First Half of 1985 with those for the First Half of 1986

A BRIEF COMPARISON OF INJURY AND FATAL TRAFFIC ACCIDENTS FOR THE FIRST HALF OF 1985 WITH THOSE FOR THE FIRST HALF OF 1986

Table 1 compares injury and fatal traffic accidents during the first six months of 1985 to injury and fatal traffic accidents during the first six months of 1986. While the total numbers of accidents and casualties are higher in the 1986 6-month period than in the 1985 6-month period, there appears to be no discernable explanation for this increase from the variables examined. However, it can be seen from Figures 1 and 2 that the 1986 increase in accidents and casualties is part of a continuing trend.

These data were drawn from the analyses of Traffic Accident Reports (MV104) supplied by the Motor Vehicle Department of the Ministry of Transportation and Highways. As the MVD constantly updates their data base, any figures produced by that body should supercede figures herein.

Table 1.
Injury and Fatal Accidents, First Six Months 1985 and 1986
British Columbia

VARIABLES	Injury Accidents January - June			Fatal Accidents January - June		
	1985	1986	% change	1985	1986	% change
# Accidents	10,997	12,873	+17.1%	179	218	+21.8%
Total # casualties	14,936	17,649	+18.2%	193 killed 151 injured	251 228	+30.1% +51.0%
Average # passengers	0.54	0.52	-3.7	0.77	0.77	0.0%
% Seatbelt use reported by occupants	88.2%	88.6%	+0.5%	55.7%	56.0%	+0.5%
Driver #1 male	66.9%	66.1%	-1.2%	82.7%	78.9%	-4.6%
Driver #1 ave. age (years)	34.0	34.0	0.0%	33.9	32.4	-4.4%
Contributing Factors:						
Vehicle fault	3.7%	3.2%	-13.5%	4.5%	4.2%	-6.7%
Driving without due care	27.8%	27.0%	-2.9%	29.6%	34.0%	+14.9%
Alcohol involvement	13.8%	12.3%	-10.9%	33.5%	34.4%	+2.7%
Unsafe speed	13.9%	14.0%	+0.7%	28.5%	39.5%	+38.6%
Failure to yield right of way	16.7%	16.8%	+0.6%	5.6%	9.3%	+66.1%
Weather	9.5%	9.5%	0.0%	7.3%	10.7%	+46.6%
Following too closely	6.7%	6.8%	+1.5%	0.6%	0.0%	-100.0%

Table 1. cont'
Injury and Fatal Accidents, First Six Months 1985 and 1986
British Columbia

VARIABLES	Injury Accidents January - June			Fatal Accidents January - June		
	1985	1986	% change	1985	1986	% change
Locations:						
Intersection	45.9%	46.1%	-1.7%	24.3%	21.1%	-13.2%
Between Intersections	39.2%	39.6%	+1.0%	63.8%	65.7%	+3.0%
"T" Junction	5.9%	6.5%	+10.2%	2.8%	6.4%	+128.6%
Bridge	1.9%	2.0%	+5.3%	2.8%	4.4%	+57.1%
Other	6.0%	5.9%	-1.7%	6.2%	2.5%	-59.6%
Rural Area	24.6%	23.3%	-5.3%	53.1%	54.6%	+2.8%
Urban Area	75.4%	76.7%	+1.7%	46.9%	45.4%	-3.2%
Commercial vehicle involved	4.7%	4.7%	0.0%	18.1%	12.1%	-33.1%
Out-of-province vehicle involved	6.2%	8.4%	+35.5%	12.0%	10.4%	-13.3%
Hit-and-Run	4.8%	5.1%	+6.3%	3.4%	3.7%	+8.8%
Motorcycle	3.9%	2.8%	-28.2%	5.0%	3.7%	-26.0%
Cyclist	7.5%	5.8%	-22.7%	5.0%	2.8%	-44.0%
Pedestrian	8.0%	7.9%	-1.3%	17.9%	18.8%	+5.0%

Litres of gasoline sold in B.C.:

First 6 months, 1985 - 1400.8 million
First 6 months, 1986 - 1339.8 million

FIGURE 1

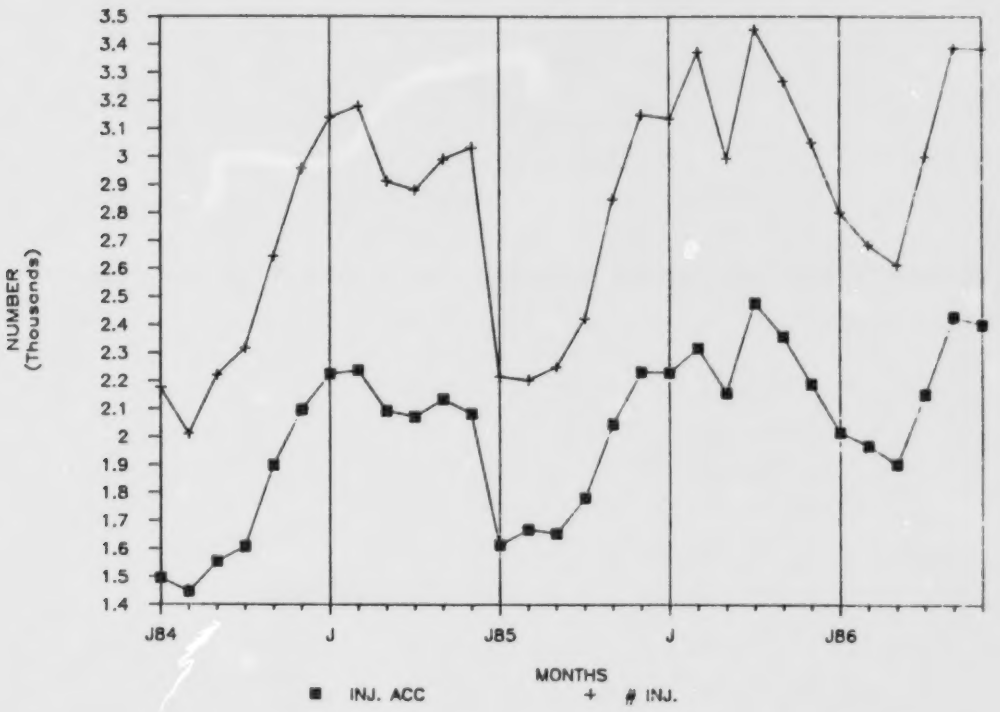
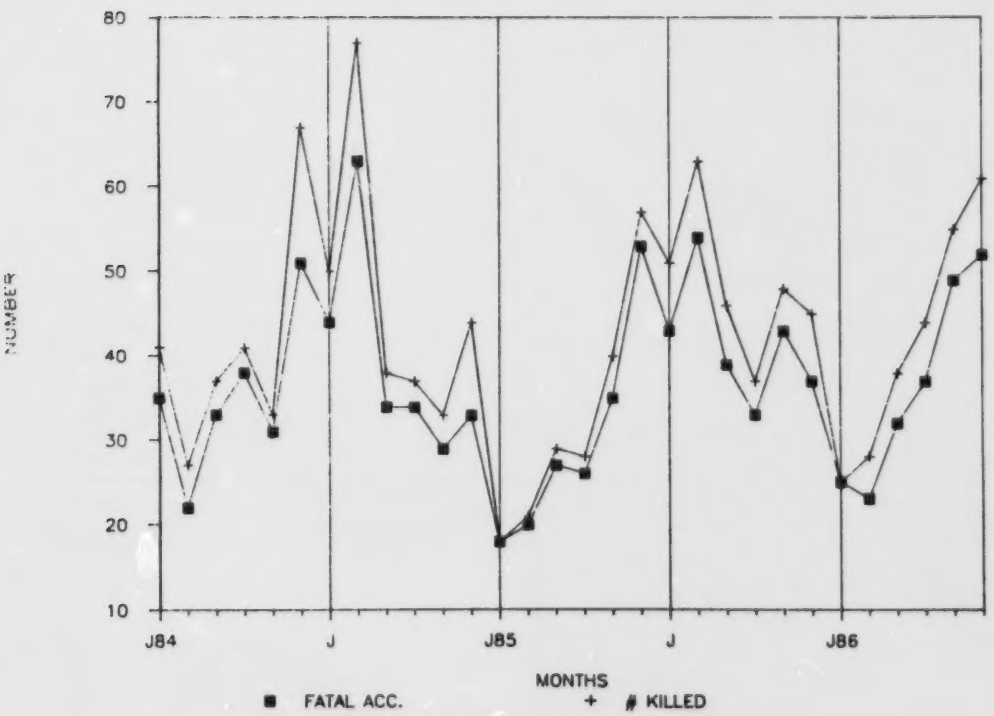


FIGURE 2



Contributing Factors to Casualty Motor Vehicle Crashes, 1985

CONTRIBUTING FACTORS TO CASUALTY MOTOR VEHICLE CRASHES IN BRITISH COLUMBIA, 1985

This report consists of a breakdown of selected contributing factors to casualty accidents (i.e. a crash where someone was injured or killed.) Each of the contributing factors was extracted from Traffic Accident Report forms (MV 104) which were submitted to the Motor Vehicle Department of the Ministry of Transportation and Highways by the police department/detachment servicing the location of the crash. It should be noted that as these computer-based files are constantly being updated by the Motor Vehicle Department, any figures produced by that department which contradict figures reported herein ought to be considered correct.

In order to interpret the information in this report, three things need to be kept in mind:

1) In most police departments/detachments, the actual number of casualty accidents is very small, so that a difference of one or two accidents can produce a very large percentage figure. Such large percentages based on a small number of accidents should not be taken as indicating any sort of trend or stable condition. They are most probably entirely random variations from police jurisdiction to police jurisdiction.

2) The contributing factors should be considered in the light of the provincial figures, and these are presented on the first page of this report.

3) Very often there is more than one contributing factor to an accident, therefore these figures can add up to more than 100%.

CONTRIBUTING FACTORS TO CASUALTY MOTOR VEHICLE CRASHES, 1985

LOCATION	No. of Crashes	% Dr. w/o Due Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
BRITISH COLUMBIA - 1982	24,262	29.7	18.9	16.7	15.7	11.8	7.0	4.1
BRITISH COLUMBIA - 1983	22,911	30.3	17.8	15.8	17.3	10.5	7.3	4.4
BRITISH COLUMBIA - 1984	23,440	29.1	15.2	15.2	17.5	11.1	7.5	4.2
BRITISH COLUMBIA - 1985	24,972	27.0	13.1	14.6	15.9	10.8	6.8	3.9
INDEPENDENT POLICE FORCES								
Central Saanich Police	81	35.8	14.8	13.6	9.9	17.3	4.9	6.2
Delta Municipal Police	408	33.8	16.2	14.0	17.6	13.0	8.6	4.4
Esquimalt Police Dept.	96	43.8	16.7	6.3	25.0	9.4	7.3	4.2
Matsqui Police Service	421	30.6	9.3	12.4	20.9	22.1	8.3	3.8
Nelson City Police	28	28.6	17.9	21.4	39.3	7.1	3.6	3.6
New Westminster Police	485	17.3	9.1	7.2	18.4	9.5	9.1	3.5
Oak Bay Police Dept.	67	10.4	7.5	14.9	26.9	9.0	7.5	3.0
Port Moody Police Dept.	110	40.9	12.7	15.5	10.9	16.4	15.5	1.8
Saanich Police Dept.	512	26.2	11.1	9.0	21.1	11.9	9.6	4.3
Vancouver City Police	4,628	11.2	7.6	5.2	16.6	4.0	3.1	2.1
Victoria City Police	666	28.5	11.3	8.0	26.4	3.6	8.0	4.2
W. Vancouver Police Dept.	296	18.9	8.8	15.2	12.8	15.2	8.4	4.7
FEDERAL AGENCIES								
Military Police	6	33.3	16.7	33.3	0.0	0.0	0.0	16.7
National Harbours Board Pol.	5	20.0	20.0	20.0	0.0	0.0	0.0	0.0
ROYAL CANADIAN MOUNTED POLICE								
AUTONOMOUS DETACHMENTS								
Burnaby	1,535	30.7	8.5	13.4	25.5	7.1	7.4	2.9
Coquitlam Rural	85	34.1	10.6	16.5	2.4	2.4	11.8	3.5
Coquitlam Municipal	420	23.1	12.6	11.4	20.7	10.0	6.9	3.6
Port Coquitlam	188	28.2	12.2	5.3	14.9	12.2	9.6	2.7
North Vancouver City	268	45.5	11.2	10.8	29.9	9.7	15.7	4.9
North Vancouver District	306	38.6	8.5	17.6	17.6	16.0	14.1	3.9
Richmond Townsnip	864	36.8	7.9	9.5	24.2	9.7	11.8	2.5
Surrey	1,670	22.9	11.9	8.1	19.3	11.0	7.4	2.9
CHILLIWACK SUB-DIVISION								
Abbotsford Rural	4	25.0	50.0	0.0	0.0	25.0	0.0	25.0
Abbotsford Municipal	130	36.2	16.2	8.5	18.5	13.1	10.8	4.6
Agassiz	69	24.6	29.0	34.8	4.3	11.6	1.4	0.0
Boston Bar	46	28.3	13.0	19.6	2.2	21.7	4.3	6.5
Chilliwack Rural	36	36.1	19.4	38.9	0.0	11.1	0.0	2.8
Chilliwack Municipal	332	25.9	14.2	13.9	13.6	10.2	4.2	5.1
Hope	149	26.8	12.1	27.5	6.7	12.1	3.4	5.4
Mission Rural	41	48.8	22.0	24.4	0.0	17.1	0.0	7.3
Mission Municipal	122	27.9	15.6	20.5	16.4	14.8	4.1	7.4
Sumas Freeway Unit C	93	33.3	17.2	7.5	5.4	6.5	3.2	8.6

LOCATION	No. of Crashes	% Dr. w/o Due Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
COURTENAY SUB-DIVISION								
Alert Bay	13	15.4	38.5	23.1	23.1	0.0	7.7	0.0
Campbell River Rural	108	38.9	26.9	33.3	2.8	25.9	4.6	3.7
Campbell River Municipal	146	39.0	20.5	19.9	17.1	11.0	15.8	6.8
Comox Municipal	24	29.2	20.8	33.3	20.8	12.5	0.0	12.5
Courtenay Rural	158	32.3	23.4	20.9	6.3	9.5	3.8	3.2
Courtenay Municipal	107	35.5	16.8	10.3	15.9	6.5	12.1	5.6
Gold River	18	22.2	5.6	38.9	0.0	33.3	0.0	0.0
Parksville	159	45.9	18.2	27.0	12.6	8.8	6.3	6.3
Port Alberni Rural	69	30.4	24.6	44.9	1.4	15.9	1.4	1.4
Port Alberni Municipal	118	41.5	19.5	19.5	29.7	5.1	9.3	6.8
Port Alice	10	50.0	50.0	30.0	0.0	20.0	0.0	10.0
Port Hardy	69	42.0	26.1	18.8	7.2	11.6	7.2	8.7
Port McNeill	44	18.2	9.1	27.3	2.3	18.2	0.0	2.3
Powell River Rural	40	37.5	20.0	37.5	10.0	20.0	5.0	0.0
Powell River Municipal	55	41.8	18.2	10.9	18.2	14.5	3.6	3.6
Quadra Island	10	50.0	50.0	40.0	10.0	10.0	0.0	0.0
Sayward	24	37.5	16.7	20.8	0.0	12.5	0.0	0.0
Tahsis	11	54.5	27.3	18.2	9.1	0.0	0.0	0.0
Tofino	10	40.0	40.0	30.0	0.0	20.0	0.0	20.0
Ucluelet	34	11.8	17.6	32.4	2.9	29.4	11.8	8.8
Texada Island	6	50.0	33.3	0.0	0.0	33.3	0.0	0.0
KAMLOOPS SUB-DIVISION								
Alexis Creek	21	28.6	14.3	14.3	0.0	28.6	0.0	4.8
Anahim Lake	16	12.5	18.8	37.5	0.0	12.5	0.0	6.3
Ashcroft	44	18.2	13.6	22.7	2.3	18.2	0.0	11.4
Barriere	32	43.8	12.5	31.3	0.0	9.4	0.0	6.3
Chase	61	45.9	24.6	29.5	0.0	4.9	1.6	3.3
Clearwater	52	34.6	15.4	23.1	5.8	23.1	1.9	7.7
Clinton	46	28.3	19.6	19.6	0.0	23.9	2.2	2.2
100 Mile House	108	39.8	23.1	45.4	3.7	14.8	7.4	4.6
Kamloops Rural	90	48.9	18.9	43.3	1.1	13.3	1.1	4.4
Kamloops Municipal	451	41.0	14.2	13.1	17.3	10.2	17.7	3.8
Lillooet	56	30.4	19.6	17.9	1.8	10.7	1.8	12.5
Logan Lake	18	55.6	38.9	27.8	0.0	5.6	0.0	5.6
Lytton	32	34.4	15.6	28.1	3.1	3.1	0.0	6.3
Merritt Rural	58	41.4	34.5	34.5	3.4	12.1	5.2	5.2
Merritt Municipal	31	25.8	16.1	19.4	22.6	12.9	3.2	3.2
Spences Bridge	27	18.5	11.1	25.9	7.4	11.1	0.0	11.1
Valemount	36	25.0	11.1	11.1	2.8	36.1	0.0	2.8
Williams Lake Rural	132	35.6	18.2	22.0	1.5	12.1	1.5	5.3
Williams Lake Municipal	95	36.8	20.0	15.8	20.0	7.4	9.5	4.2
KELOWNA SUB-DIVISION								
Armstrong	40	60.0	20.0	37.5	7.5	15.0	2.5	0.0
Enderby	33	21.2	21.2	24.2	15.2	21.2	6.1	3.0
Faulkland	18	27.8	27.8	27.8	0.0	22.2	0.0	5.6
Kelowna Rural	191	32.5	15.7	18.8	6.8	13.1	8.4	3.1
Kelowna Municipal	490	34.9	15.9	10.0	21.0	5.1	8.8	3.1

LOCATION	No. of Crashes	% Dr. w/o Due Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
Keremeos	46	26.1	19.6	19.6	2.2	15.2	2.2	6.5
Lumby	29	10.3	13.8	17.2	6.9	17.2	0.0	17.2
Oliver	35	31.4	17.1	17.1	11.4	0.0	2.9	5.7
Osoyoos	47	25.5	25.5	21.3	6.4	6.4	10.6	4.3
Penticton Rural	67	38.8	22.4	25.4	9.0	9.0	3.0	9.0
Penticton Municipal	200	31.5	13.0	9.5	16.0	4.0	10.5	1.5
Princeton	89	27.0	20.2	36.0	0.0	10.1	5.6	5.6
Revelstoke	119	27.7	13.4	25.2	10.1	16.8	2.5	10.1
Salmon Arm Rural	37	32.4	21.6	13.5	2.7	13.5	2.7	2.7
Salmon Arm Municipal	69	37.7	18.8	18.8	13.0	14.5	8.7	1.4
Sicamous	51	25.5	21.6	37.3	2.0	17.6	2.0	7.8
Summerland Municipal	37	16.2	16.2	32.4	8.1	5.4	8.1	8.1
Vernon Rural	116	28.4	21.6	18.1	12.9	10.3	10.3	6.0
Vernon Municipal	212	26.4	13.7	13.2	25.5	6.6	9.4	2.8
NELSON SUB-DIVISION								
Castlegar Rural	45	35.6	20.0	15.6	6.7	13.3	0.0	2.2
Castlegar Municipal	38	34.2	18.4	7.9	15.8	7.9	13.2	0.0
Cranbrook Rural	55	25.5	25.5	32.7	0.0	25.5	5.5	5.5
Cranbrook Municipal	63	30.2	23.8	12.7	14.3	14.3	9.5	9.5
Crescent Valley	40	32.5	12.5	25.0	10.0	32.5	2.5	0.0
Creston	74	24.3	20.3	27.0	8.1	14.9	4.1	8.1
Elkford	13	23.1	7.7	30.8	7.7	0.0	0.0	7.7
Fernie	49	46.9	16.3	22.4	14.3	4.1	6.1	4.1
Field	14	14.3	7.1	28.6	7.1	14.3	0.0	0.0
Fruitvale	26	19.2	19.2	34.6	3.8	11.5	7.7	11.5
Golden	89	22.5	11.2	20.2	11.2	15.7	2.2	9.0
Grand Forks	65	38.5	20.0	30.8	1.5	23.1	1.5	6.2
Invermere	53	26.4	22.6	28.3	11.3	9.4	0.0	5.7
Kaslo	17	35.3	17.6	23.5	0.0	0.0	5.9	11.8
Kimberley Rural	21	19.0	38.1	14.3	0.0	23.8	9.5	4.8
Kimberley Municipal	18	44.4	11.1	11.1	5.6	5.6	5.6	5.6
Midway	30	20.0	23.3	23.3	6.7	16.7	0.0	6.7
Nakusp	27	40.7	22.2	11.1	3.7	18.5	0.0	14.8
Nelson	35	25.7	14.3	20.0	5.7	20.0	2.9	0.0
New Denver	12	25.0	25.0	25.0	8.3	25.0	0.0	8.3
Radium	32	28.1	15.6	25.0	0.0	25.0	0.0	15.6
Rossland	21	14.3	4.8	4.8	0.0	19.0	4.8	0.0
Salmo	38	23.7	21.1	23.7	7.9	18.4	0.0	7.9
Sparwood	40	47.5	17.5	30.0	0.0	20.0	2.5	7.5
Trail Rural	20	50.0	20.0	20.0	0.0	5.0	0.0	10.0
Trail Municipal	39	25.6	2.6	7.7	15.4	10.3	7.7	2.6
PRINCE GEORGE SUB-DIVISION								
Burns Lake	53	24.5	13.2	26.4	5.7	15.1	5.7	11.3
Chetwynd	65	24.6	15.4	32.3	1.5	21.5	0.0	6.2
Dawson Creek Rural	74	40.5	23.0	32.4	5.4	12.2	2.7	5.4
Dawson Creek Municipal	53	37.7	11.3	17.0	24.5	5.7	13.2	1.9
Fort Nelson	60	26.7	11.7	16.7	5.0	16.7	1.7	10.0
Fort St. James	33	48.5	51.5	39.4	3.0	0.0	3.0	9.1

LOCATION	No. of Crashes	% Dr. w/oDue Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Ven. Fault
Fort St. John Rural	70	28.6	15.7	27.1	5.7	21.4	2.9	8.6
Fort St. John Municipal	54	24.1	16.7	16.7	35.2	3.7	1.9	3.7
Fraser Lake	26	23.1	23.1	19.2	0.0	15.4	3.8	3.8
Hudson Hope	13	53.8	15.4	38.5	15.4	7.7	0.0	0.0
Mackenzie Rural	31	19.4	3.2	29.0	0.0	25.8	0.0	3.2
Mackenzie Municipal	19	36.8	10.5	26.3	5.3	0.0	15.8	5.3
McBride	27	33.3	3.7	7.4	0.0	18.5	0.0	3.7
Prince George Rural	146	29.5	15.8	26.7	1.4	17.8	1.4	3.4
Prince George City	438	38.8	16.2	17.8	16.7	9.1	8.0	2.3
Quesnel Rural	121	24.8	15.7	21.5	6.6	21.5	2.5	5.0
Quesnel Municipal	67	34.3	16.4	17.9	20.9	6.0	10.4	3.0
Tumbler Ridge	29	31.0	17.2	27.6	6.9	6.9	0.0	0.0
Vanderhoof	61	31.1	8.2	16.4	4.9	19.7	3.3	9.8
Watson Lake, Teslin	7	14.3	14.3	14.3	0.0	14.3	0.0	28.6
Wells	14	35.7	21.4	14.3	0.0	7.1	0.0	7.1
PRINCE RUPERT SUB-DIVISION								
Atlin	1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Bella Coola	14	57.1	21.4	35.7	0.0	7.1	0.0	14.3
Cassiar	14	35.7	28.6	35.7	7.1	21.4	0.0	0.0
Dease Lake	28	17.9	25.0	28.6	0.0	17.9	0.0	0.0
Granisle	6	16.7	16.7	0.0	0.0	16.7	0.0	0.0
Hazelton	58	20.7	19.0	17.2	8.6	22.4	5.2	1.7
Houston	37	35.1	21.6	18.9	0.0	10.8	8.1	2.7
Kitimat Rural	16	37.5	12.5	25.0	0.0	37.5	0.0	6.3
Kitimat Municipal	28	14.3	17.9	21.4	21.4	35.7	10.7	7.1
Masset	21	33.3	28.6	28.6	0.0	23.8	0.0	0.0
New Aiyansh	6	16.7	0.0	16.7	0.0	33.3	0.0	0.0
Prince Rupert Rural	28	25.0	21.4	17.9	3.6	10.7	3.6	7.1
Prince Rupert City	81	38.3	18.5	14.8	18.5	12.3	6.2	3.7
Queen Charlotte	18	22.2	16.7	27.8	0.0	22.2	0.0	0.0
Smithers	77	28.6	27.3	24.7	11.7	10.4	2.6	1.3
Stewart	24	8.3	12.5	20.8	0.0	50.0	4.2	4.2
Terrace Rural	67	10.4	17.9	34.3	4.5	32.8	3.0	6.0
Terrace Municipal	66	25.8	28.8	21.2	16.7	7.6	3.0	0.0
VANCOUVER SUB-DIVISION								
Gibsons	52	44.2	32.7	36.5	7.7	13.5	3.8	3.8
Langley City	188	27.7	15.4	12.2	30.9	14.9	7.4	1.1
Langley Township	427	27.6	13.1	21.1	17.8	22.5	7.3	3.7
Maple Ridge Rural	49	32.7	18.4	28.6	12.2	30.6	8.2	4.1
Maple Ridge Municipal	217	30.4	22.6	23.0	18.4	17.5	10.1	3.2
Pemberton	25	12.0	36.0	40.0	0.0	20.0	4.0	16.0
Sechelt	47	23.4	31.9	46.8	4.3	21.3	6.4	4.3
Squamish Rural	64	23.4	10.9	23.4	0.0	25.0	4.7	1.6
Squamish Municipal	74	27.0	18.9	21.6	14.9	12.2	6.8	5.4
University	60	30.0	5.0	41.7	28.3	23.3	1.7	1.7
Vancouver-Bowen Island	9	11.1	11.1	22.2	0.0	0.0	0.0	11.1
Whistler	37	10.8	21.6	35.1	8.1	37.5	0.0	10.8

LOCATION	No. of Crashes	% Dr. w/oDue Care	% Alcohol Rel'd	% Dr. Unsafe Speed	% Fail to Yield	% Due to Weather	% Fol. too Close	% Veh. Fault
White Rock	80	27.5	6.3	3.8	25.0	5.0	7.5	6.3
Deas Isle Freeway Patrol (Unit A)	145	29.0	9.7	10.3	3.4	8.3	15.9	9.0
Port Mann Freeway Patrol (Unit B)	333	34.2	10.2	18.3	0.6	16.5	18.0	5.7
VICTORIA SUB-DIVISION								
Chemainus	31	22.5	12.9	25.8	19.4	9.7	3.2	9.7
Colwood	243	36.6	16.0	25.1	14.4	17.3	10.7	6.2
Duncan	115	33.9	15.7	20.9	13.0	18.3	12.2	3.5
Duncan - North Cowichan	104	27.9	18.3	28.8	12.5	20.2	1.0	8.7
Gabriola Island	22	36.4	31.8	22.7	9.1	13.6	4.5	4.5
Ganges	34	41.2	14.7	38.2	8.8	14.7	5.9	11.8
Ladysmith	57	19.3	15.8	10.5	8.8	17.5	3.5	1.8
Lake Cowichan	40	12.5	20.0	15.0	5.0	45.0	0.0	5.0
Nanaimo Rural	49	26.5	26.5	34.7	10.2	16.3	2.0	4.1
Nanaimo Municipal	460	30.4	10.9	14.6	21.7	6.7	14.3	5.0
Pender Island	11	18.2	9.1	36.4	0.0	9.1	0.0	18.2
Shawnigan Lake	78	34.6	6.4	14.1	15.4	20.5	1.3	3.8
Sidney Rural	7	57.1	42.9	42.9	14.3	14.3	14.3	14.3
Sidney Municipal	72	37.5	18.1	13.9	23.6	8.3	11.1	1.4
Sooke	84	36.9	22.6	36.9	7.1	16.7	4.8	2.4

The Percentage of Injuries and Deaths Associated with Drinking Driving by Police Jurisdiction: British Columbia, 1985

THE PERCENTAGE OF INJURIES AND DEATHS ASSOCIATED WITH DRINKING DRIVING BY POLICE JURISDICTION: BRITISH COLUMBIA, 1985.

Traffic accidents that produce injury or death are investigated by the police in British Columbia, and in the process of investigation, the officers judge whether or not the accident was caused by the driver(s) being impaired. These judgements are recorded on the Traffic Accident Investigation Form (MV104) and are compiled into computer-readable data by the Motor Vehicle Division of the Ministry of Transportation and Highways (B.C.)

This report lists, for each police reporting jurisdiction, the number of persons injured in 1985 and the percentage of those who were injured in alcohol-related traffic accidents (as taken from the MV104). In addition, similar information is presented for fatalities. It should be noted that as these computer-based files are constantly being updated by the Motor Vehicle Department, any figures produced by that department which contradict figures reported herein ought to be considered correct.

In order to interpret the information in this report, three things need to be kept in mind:

1) In most police departments/detachments, the actual number of accidents is very small, so that a difference of one or two accidents can produce a very large percentage figure. Such large percentages based on a small number of accidents should not be taken as indicating any sort of trend or stable condition. They are most probably entirely random variations from police jurisdiction to police jurisdiction.

2) This information should be considered in the light of the provincial figures, and these are presented on the first page of this report.

THE PERCENTAGE OF INJURIES AND DEATHS ASSOCIATED WITH DRINKING DRIVING BY POLICE JURISDICTION: BRITISH COLUMBIA, 1985.

LOCATION	Total # persons injured	% Injured Alcohol Related	Total # persons killed	% Killed Alcohol Related
BRITISH COLUMBIA	34,371	14.4%	483	29.8%
INDEPENDENT FORCES				
Central Saanich Police	113	16%	2	50%
Delta Municipal Police	535	18%	6	33%
Esquimalt Police Dept.	121	19%	0	0%
Matsqui Police Service	608	10%	11	27%
Nelson City Police	30	17%	1	0%
New Westminster Police	644	10%	1	0%
Oak Bay Police Dept.	79	10%	0	0%
Port Moody Police Dept.	152	19%	0	0%
Saanich Police Dept.	691	11%	6	17%
Vancouver City Police	5,997	9%	33	24%
Victoria City Police	844	13%	1	100%
West Vancouver Police Dept.	404	10%	3	33%
FEDERAL AGENCIES				
Military Police	6	17%	0	0%
National Harbours Board Police	5	20%	0	0%
ROYAL CANADIAN MOUNTED POLICE				
AUTONOMOUS DETACHMENTS				
Burnaby	2,114	9%	9	0%
Coquitlam Rural	113	12%	0	0%
Coquitlam Municipal	576	14%	4	25%
Port Coquitlam	263	12%	0	0%
North Vancouver City	321	11%	3	0%
North Vancouver District	392	8%	2	50%
Richmond Township	1,147	9%	3	67%
Surrey	2,496	13%	16	38%
CHILLIWACK SUB-DIVISION				
Abbotsford Rural	6	50%	0	0%
Abbotsford Municipal	194	19%	0	0%
Agassiz	128	33%	5	60%
Boston Bar	69	14%	4	0%
Chilliwack Rural	57	19%	0	0%
Chilliwack Municipal	426	16%	4	0%
Hope	237	13%	10	20%
Mission Rural	61	26%	3	100%
Mission Municipal	180	18%	2	50%
Sumas Freeway Patrol (Unit C)	144	16%	6	33%

LOCATION	Total # persons injured	% Injured Alcohol Related	Total # persons killed	% Killed Alcohol Related
COURTENAY SUB-DIVISION				
Alert Bay	15	47%	0	0%
Campbell River Rural	131	26%	4	75%
Campbell River Municipal	202	22%	2	0%
Comox Municipal	28	18%	0	0%
Courtenay Rural	244	27%	3	100%
Courtenay Municipal	155	19%	1	0%
Gold River	24	8%	0	0%
Parksville	246	19%	5	0%
Port Alberni Rural	99	25%	1	100%
Port Alberni Municipal	160	23%	0	0%
Port Alice	13	38%	0	0%
Port Hardy	91	26%	5	80%
Port McNeill	61	7%	0	0%
Powell River Rural	54	26%	3	100%
Powell River Municipal	76	16%	0	0%
Quadra Island	16	63%	0	0%
Sayward	35	23%	2	0%
Tahsis	15	33%	0	0%
Tofino	19	42%	0	0%
Ucluelet	53	19%	2	0%
Texada Island	9	44%	0	0%
KAMLOOPS SUB-DIVISION				
Alexis Creek	35	29%	0	0%
Anahim Lake	35	20%	0	0%
Ashcroft	64	14%	2	0%
Barriere	41	22%	5	60%
Chase	86	23%	6	17%
Clearwater	83	16%	4	50%
Clinton	61	15%	3	33%
100 Mile House	152	19%	5	100%
Kamloops Rural	128	18%	7	43%
Kamloops Municipal	632	16%	8	38%
Lillooet	93	23%	6	17%
Logan Lake	28	36%	0	0%
Lytton	56	9%	3	0%
Merritt Rural	75	35%	4	25%
Merritt Municipal	47	19%	1	0%
Spences Bridge	40	8%	3	33%
Valemount	58	7%	4	25%
Williams Lake Rural	204	21%	5	20%
Williams Lake Municipal	134	18%	2	50%
KELOWNA SUB-DIVISION				
Armstrong	58	19%	2	0%
Enderby	43	26%	1	0%
Faulkland	26	23%	2	0%
Kelowna Rural	274	18%	10	20%
Kelowna Municipal	636	18%	13	38%

LOCATION	Total # persons injured	% Injured Alcohol Related	Total # persons killed	% Killed Alcohol Related
Keremeos	71	17%	1	0%
Lumby	49	12%	0	0%
Oliver	47	13%	2	0%
Osoyoos	65	29%	2	100%
Penticton Rural	98	26%	0	0%
Penticton Municipal	269	12%	4	25%
Princeton	158	19%	5	40%
Revelstoke	178	15%	5	40%
Salmon Arm Rural	57	28%	1	0%
Salmon Arm Municipal	95	17%	5	40%
Sicamous	69	17%	1	0%
Summerland Municipal	53	17%	0	0%
Vernon Rural	180	27%	3	33%
Vernon Municipal	286	16%	6	0%
NELSON SUB-DIVISION				
Castlegar Rural	75	23%	1	0%
Castlegar Municipal	44	14%	2	50%
Cranbrook Rural	81	21%	5	40%
Cranbrook Municipal	82	22%	3	33%
Crescent Valley	59	12%	1	0%
Creston	92	23%	2	100%
Elkford	14	7%	0	0%
Fernie	62	19%	0	0%
Field	28	7%	1	0%
Fruitvale	27	19%	1	0%
Golden	135	10%	7	14%
Grand Forks	96	25%	4	75%
Invermere	66	20%	5	60%
Kaslo	22	14%	0	0%
Kimberley Rural	25	44%	1	100%
Kimberley Municipal	27	19%	0	0%
Midway	38	18%	1	100%
Nakusp	37	27%	0	0%
Nelson	47	11%	1	0%
New Denver	15	20%	0	0%
Radium	50	12%	2	0%
Rossland	26	4%	0	0%
Salmo	72	22%	3	0%
Sparwood	44	20%	1	100%
Trail Rural	27	15%	0	0%
Trail Municipal	44	2%	0	0%
PRINCE GEORGE SUB-DIVISION				
Burns Lake	74	14%	3	33%
Chetwynd	95	15%	4	25%
Dawson Creek Rural	101	25%	7	57%
Dawson Creek Municipal	69	14%	0	0%
Fort Nelson	87	13%	3	0%
Fort St. James	46	57%	2	50%

LOCATION	Total # persons injured	% Alcohol Related	Total # persons killed	% Alcohol Related
Fort St. John Rural	82	17%	6	17%
Fort St. John Municipal	67	25%	4	0%
Fraser Lake	34	29%	0	0%
Hudson Hope	20	20%	0	0%
Mackenzie Rural	58	3%	0	0%
Mackenzie Municipal	29	7%	0	0%
McBride	40	3%	0	0%
Prince George Rural	189	16%	6	0%
Prince George City	576	18%	9	33%
Quesnel Rural	183	19%	10	30%
Quesnel Municipal	101	14%	0	0%
Tumbler Ridge	40	15%	0	0%
Vanderhoof	85	12%	4	25%
Watson Lake, Teslin	11	36%	3	0%
Wells	20	20%	0	0%
PRINCE RUPERT SUB-DIVISION				
Atlin	1	0%	0	0%
Bella Coola	20	25%	1	0%
Cassiar	16	31%	0	0%
Dease Lake	41	37%	3	0%
Granisle	16	25%	0	0%
Hazelton	82	22%	3	0%
Houston	58	29%	2	0%
Kitimat Rural	35	20%	1	100%
Kitimat Municipal	36	25%	1	0%
Masset	32	31%	2	100%
New Aiyansh	6	0%	1	0%
Prince Rupert Rural	36	36%	7	0%
Prince Rupert Municipal	104	21%	1	100%
Queen Charlotte City	27	7%	1	100%
Smithers	117	23%	2	100%
Stewart	37	19%	1	0%
Terrace Rural	93	23%	3	0%
Terrace Municipal	88	33%	2	50%
VANCOUVER SUB-DIVISION				
Gibsons	71	32%	1	100%
Langley City	272	17%	1	0%
Langley Township	626	14%	11	9%
Maple Ridge Rural	78	26%	1	100%
Maple Ridge Municipal	292	26%	4	25%
Pemberton	41	39%	1	100%
Sechelt	63	32%	3	0%
Squamish Rural	84	10%	3	0%
Squamish Municipal	100	20%	2	50%
University	75	4%	0	0%
Vancouver-Bowen Island	10	10%	0	0%
Whistler	47	19%	1	100%

LOCATION	Total # persons injured	% Injured Alcohol Related	Total # persons killed	% Killed Alcohol Related
White Rock	104	9%	0	0%
Deas Isle Freeway Patrol (Unit A)	234	26%	2	50%
Port Mann Freeway Patrol (Unit B)	491	5%	6	0%
VICTORIA SUB-DIVISION				
Chemainus	45	11%	2	50%
Colwood	351	21%	2	0%
Duncan	159	14%	2	0%
Duncan - North Cowichan	143	22%	0	0%
Gabriola Island	32	41%	0	0%
Ganges	47	17%	0	0%
Ladysmith	80	14%	2	50%
Lake Cowichan	60	18%	0	0%
Nanaimo Rural	77	38%	2	0%
Nanaimo Municipal	604	12%	3	33%
Pender Island	16	13%	0	0%
Shawnigan Lake	110	9%	1	100%
Sidney Rural	14	43%	0	0%
Sidney Municipal	87	11%	2	0%
Sooke	108	22%	3	0%

Locations of Casualty Motor Vehicle Crashes, 1985

LOCATIONS OF CASUALTY MOTOR VEHICLE CRASHES IN BRITISH COLUMBIA, 1985

This report consists of a breakdown of the locations of casualty accidents (i.e. a crash where someone was injured or killed.) Each of the locations was extracted from the Traffic Accident Report forms (MV 104) which were submitted to the Motor Vehicle Department of the Ministry of Transportation and Highways by the police department/detachment servicing the location of the crash. It should be noted that as these computer-based files are constantly being updated by the Motor Vehicle Department, any figures produced by that department which contradict figures reported herein ought to be considered correct.

In order to interpret the information in this report, two things need to be kept in mind:

1) In most police departments/detachments, the actual number of casualty accidents is very small, so that a difference of one or two accidents can produce a very large percentage figure. Such large percentages based on a small number of accidents should not be taken as indicating any sort of trend or stable condition. They are most probably entirely random variations from police jurisdiction to police jurisdiction.

2) The location codes should be considered in the light of the provincial figures, and these are presented on the first page of the report.

LOCATIONS OF CASUALTY MOTOR VEHICLE CRASHES, 1985

POLICE REPORTING GROUP	No. of Crashes	% At Inter-section	% Between Inter-section	% "T" Junct-ion	% Bridge	% Other
BRITISH COLUMBIA - 1984	23,440	44.1	40.5	6.2	2.2	7.1
BRITISH COLUMBIA - 1985	24,635	45.0	40.6	6.1	2.1	6.1
INDEPENDENT POLICE FORCES						
Central Saanich Police	80	38.8	52.5	3.8	0.0	5.0
Delta Municipal Police	403	42.9	35.0	12.7	0.2	9.2
Esquimalt Police Dept.	93	53.8	31.2	7.5	0.0	7.5
Matsqui Police Service	420	43.8	36.4	11.4	1.9	6.4
Nelson City Police	27	63.0	29.6	7.4	0.0	0.0
New Westminster Police	496	57.3	33.1	2.8	2.2	4.6
Oak Bay Police Dept.	66	54.5	37.9	3.0	0.0	4.5
Port Moody Police Dept.	112	53.6	37.5	5.4	0.0	3.6
Saanich Police Dept.	514	49.6	34.0	9.5	0.6	6.2
Vancouver City Police	4,553	59.9	32.5	3.4	2.0	2.3
Victoria City Police	663	62.3	28.1	5.4	0.3	3.9
W. Vancouver Police Dept.	292	29.5	38.7	4.5	14.4	13.0
FEDERAL AGENCIES						
Military Police	4	25.0	25.0	0.0	0.0	50.0
National Harbour Board Pol.	5	0.0	40.0	0.0	20.0	40.0
ROYAL CANADIAN MOUNTED POLICE						
AUTONOMOUS DETACHMENTS						
Burnaby	1,544	62.8	27.0	6.4	0.5	3.3
Coquitlam Rural	74	44.6	39.1	1.4	0.0	14.9
Coquitlam Municipal	405	52.8	29.9	6.9	1.0	9.4
Port Coquitlam	188	53.2	34.0	7.4	0.0	5.3
North Vancouver City	270	64.1	26.3	6.3	0.4	3.0
North Vancouver District	303	47.2	40.3	6.6	0.3	5.6
Richmond Township	859	48.1	30.4	9.0	3.4	9.2
Surrey	1,752	54.7	31.2	9.3	0.4	4.4
CHILLIWACK SUB-DIVISION						
Abbotsford Rural	4	25.0	50.0	25.0	0.0	0.0
Abbotsford Municipal	126	44.4	32.5	11.1	0.0	11.9
Agassiz	70	22.9	65.7	2.9	4.3	4.3
Boston Bar	46	8.7	76.1	8.7	2.2	4.3
Chilliwack Rural	33	12.1	60.6	3.0	6.1	18.2
Chilliwack Municipal	326	41.4	42.9	6.7	0.9	8.0
Hope	146	13.7	77.4	2.1	3.4	3.4
Mission Rural	40	20.0	60.0	7.5	0.0	12.5
Mission Municipal	119	42.0	42.0	5.9	3.4	6.7
Sumas Freeway Patrol (Unit C)	84	14.3	70.2	3.6	4.8	7.1

POLICE REPORTING GROUP	No. of Crashes	% At Intersection	% Between Intersection	% "T" Junction	% Bridge	% Other
COURTENAY SUB-DIVISION						
Alert Bay	13	30.8	38.5	0.0	0.0	30.8
Campbell River Rural	107	15.9	66.4	6.5	2.8	8.4
Campbell River Municipal	146	48.6	29.5	16.4	0.7	4.8
Comox Municipal	24	54.2	37.5	4.2	0.0	4.2
Courtenay Rural	145	26.2	53.1	6.9	2.1	11.7
Courtenay Municipal	104	40.4	35.6	16.3	0.0	7.7
Gold River	16	6.3	87.5	0.0	0.0	6.3
Parksville	156	37.8	45.5	7.7	3.2	5.8
Port Alberni Rural	63	11.1	63.5	4.8	3.2	17.5
Port Alberni Municipal	116	57.8	25.9	5.2	2.6	8.6
Port Alice	10	0.0	90.0	0.0	0.0	10.0
Port Hardy	62	24.2	59.7	1.6	1.6	12.9
Port McNeill	36	16.7	69.4	0.0	8.3	5.6
Powell River Rural	33	15.2	63.6	6.1	3.0	12.1
Powell River Municipal	51	52.9	31.4	11.8	0.0	3.9
Quadra Island	10	10.0	90.0	0.0	0.0	0.0
Sayward	23	4.3	87.0	0.0	0.0	8.7
Tahsis	11	27.3	45.5	0.0	0.0	27.3
Tofino	8	12.5	75.0	12.5	0.0	0.0
Ucluelet	28	17.9	60.7	3.6	3.6	14.3
Texada Island	6	16.7	83.3	0.0	0.0	0.0
KAMLOOPS SUB-DIVISION						
Alexis Creek	18	5.6	72.2	5.6	5.6	11.1
Anahim Lake	14	0.0	21.4	0.0	7.1	71.4
Ashcroft	44	13.6	72.7	4.5	4.5	4.5
Barriere	32	12.5	81.3	3.1	0.0	3.1
Chase	58	5.2	82.8	3.4	6.9	1.7
Clearwater	49	18.4	69.4	6.1	2.0	4.1
Clinton	45	2.2	91.1	2.2	0.0	4.4
100 Mile House	105	15.2	61.0	10.5	1.0	12.4
Kamloops Rural	85	8.2	88.2	0.0	1.2	2.4
Kamloops Municipal	440	51.6	30.7	6.8	3.0	8.0
Lillooet	53	15.1	69.8	1.9	9.4	3.8
Logan Lake	18	11.1	66.7	5.6	0.0	16.7
Lytton	31	0.0	80.5	6.5	9.7	3.2
Merritt Rural	57	3.5	75.4	10.5	1.8	8.8
Merritt Municipal	31	51.6	25.8	0.0	3.2	19.4
Spences Bridge	27	7.4	70.4	0.0	3.7	18.5
Valemount	36	2.8	75.0	0.0	11.1	11.1
Williams Lake Rural	122	22.1	63.9	7.4	0.0	6.6
Williams Lake Municipal	94	54.3	31.9	7.4	0.0	6.4
KELOWNA SUB-DIVISION						
Armstrong	39	12.8	69.2	15.4	0.0	2.6
Enderby	33	27.3	36.4	12.1	0.0	24.2
Falkland	18	5.6	94.4	0.0	0.0	0.0
Kelowna Rural	188	25.0	57.4	8.0	2.1	7.4
Kelowna Municipal	479	54.7	32.2	6.7	0.8	5.6

POLICE REPORTING GROUP	No. of Crashes	% At Intersection	% Between Intersection	% "T" Junction	% Bridge	% Other
Keremeos	46	6.5	65.2	13.0	0.0	15.2
Lumby	29	3.4	75.9	10.3	3.4	6.9
Oliver	34	23.5	50.0	5.9	0.0	20.6
Osoyoos	46	26.1	58.7	2.2	0.0	13.0
Penticton Rural	66	31.8	57.6	4.5	1.5	4.5
Penticton Municipal	196	57.1	34.7	3.1	0.5	4.6
Princeton	80	10.0	78.8	5.0	5.0	1.3
Revelstoke	111	27.0	51.4	4.5	4.5	12.6
Salmon Arm Rural	35	28.6	57.1	2.9	2.9	8.6
Salmon Arm Municipal	67	38.8	46.3	1.5	1.5	7.5
Sicamous	47	12.8	66.0	2.1	2.1	19.1
Summerland Municipal	35	37.1	45.7	14.3	0.0	2.9
Vernon Rural	114	24.6	65.8	5.3	0.0	4.4
Vernon Municipal	209	58.9	30.1	8.1	0.5	2.4
NELSON SUB-DIVISION						
Castlegar Rural	44	25.0	59.1	4.5	0.0	11.4
Castlegar Municipal	37	48.6	43.2	5.4	0.0	2.7
Cranbrook Rural	55	7.3	83.6	5.5	3.6	0.0
Cranbrook Municipal	64	56.3	35.9	0.0	1.6	6.3
Crescent Valley	38	13.2	65.8	10.5	2.6	7.9
Creston	73	27.4	64.4	8.2	0.0	0.0
Elkford	13	15.4	69.2	7.7	0.0	7.7
Fernie	44	34.1	47.7	4.5	6.8	6.8
Field	13	15.4	61.5	7.7	7.7	7.7
Fruitvale	25	24.0	64.0	4.0	4.0	4.0
Golden	89	16.9	64.0	5.6	6.7	6.7
Grand Forks	63	14.3	63.5	3.2	4.8	14.3
Invermere	52	28.8	57.7	7.7	3.8	1.9
Kaslo	17	11.8	76.5	0.0	0.0	11.8
Kimberley Rural	20	10.0	75.0	0.0	5.0	10.0
Kimberley Municipal	18	50.0	50.0	0.0	0.0	0.0
Midway	28	14.3	75.0	3.6	7.1	0.0
Nakusp	21	28.6	52.4	4.8	0.0	14.3
Nelson	35	5.7	77.1	5.7	8.6	2.9
New Denver	12	41.7	50.0	8.3	0.0	0.0
Radium	31	9.7	83.9	3.2	0.0	3.2
Rossland	17	5.9	88.2	5.9	0.0	0.0
Salmo	38	10.5	71.1	2.6	5.3	10.5
Sparwood	39	12.8	71.8	0.0	2.6	12.8
Trail Rural	18	22.2	61.1	0.0	5.6	11.1
Trail Municipal	39	48.7	43.6	0.0	0.0	7.7
PRINCE GEORGE SUB-DIVISION						
Burns Lake	51	21.6	62.7	5.9	2.0	7.8
Chetwynd	63	14.3	71.4	6.3	1.6	6.3
Dawson Creek Rural	74	25.7	63.5	4.1	0.0	6.8
Dawson Creek Municipal	53	64.2	28.3	5.7	0.0	1.9
Fort Nelson	57	10.5	64.9	1.8	8.8	14.0
Fort St. James	30	10.0	76.7	6.7	3.3	3.3

POLICE REPORTING GROUP	No. of Crashes	% At Inter-section	% Between Inter-section	% "T" Junct-ion	% Bridge	% Other
Fort St. John Rural	67	23.9	62.7	0.0	3.0	10.4
Fort St. John Municipal	53	66.0	24.5	3.8	0.0	5.7
Fraser Lake	25	12.0	80.0	0.0	0.0	8.0
Hudson Hope	11	18.2	63.6	18.2	0.0	0.0
Mackenzie Rural	29	0.0	82.8	0.0	0.0	17.2
Mackenzie Municipal	19	36.8	36.8	21.1	0.0	5.3
McBride	27	11.1	81.5	0.0	7.4	0.0
Prince George Rural	143	11.2	74.1	2.1	1.4	11.2
Prince George City	437	51.7	33.6	6.6	0.5	7.6
Quesnel Rural	118	16.1	66.9	5.1	0.0	11.9
Quesnel Municipal	59	50.8	30.5	6.8	5.1	6.8
Tumbler Ridge	28	14.3	64.3	3.6	0.0	17.9
Vanderhoof	61	18.0	62.3	6.6	3.3	9.8
Watson Lake, Teslin	7	0.0	100.0	0.0	0.0	0.0
Wells	13	0.0	84.6	0.0	0.0	15.4
PRINCE RUPERT SUB-DIVISION						
Atlin	1	0.0	0.0	0.0	0.0	100.0
Bella Coola	14	0.0	78.6	7.1	7.1	7.1
Cassiar	14	0.0	92.9	0.0	0.0	7.1
Dease Lake	29	3.4	75.9	0.0	6.9	13.8
Granisle	6	0.0	100.0	0.0	0.0	0.0
Hazelton	57	15.8	68.4	1.8	5.3	8.8
Houston	36	22.2	66.7	5.6	0.0	5.6
Kitimat Rural	12	0.0	75.0	0.0	0.0	25.0
Kitimat Municipal	28	46.4	46.4	3.6	0.0	3.6
Masset	21	9.5	71.4	4.8	4.8	9.5
New Aiyansh	6	0.0	100.0	0.0	0.0	0.0
Prince Rupert Rural	28	7.1	71.4	7.1	3.6	10.7
Prince Rupert City	81	48.1	44.4	0.0	1.2	6.2
Queen Charlotte	16	0.0	62.5	25.0	0.0	12.5
Smithers	75	30.7	52.0	6.7	1.3	9.3
Stewart	24	4.2	66.7	0.0	4.2	25.0
Terrace Rural	66	15.2	68.2	1.5	7.6	7.6
Terrace Municipal	65	53.8	30.8	4.6	3.1	7.7
VANCOUVER SUB-DIVISION						
Gibsons	48	27.1	58.3	6.3	0.0	8.3
Langley City	189	65.6	21.2	7.4	0.0	5.8
Langley Township	427	40.7	40.5	8.0	0.5	10.3
Maple Ridge Rural	49	28.6	55.1	14.3	0.0	2.0
Maple Ridge Municipal	218	48.2	35.8	10.6	0.5	5.0
Pemberton	24	4.2	75.0	8.3	0.0	12.5
Sechelt	46	28.3	58.7	4.3	0.0	8.7
Squamish Rural	59	10.2	64.4	1.7	11.9	11.9
Squamish Municipal	71	38.0	47.9	5.6	5.6	2.8
University	60	48.3	45.0	0.0	0.0	6.7
Vancouver-Bowen Island	9	0.0	66.7	22.2	0.0	11.1
Whistler	35	20.0	71.4	2.9	0.0	5.7

POLICE REPORTING GROUP	No. of Crashes	% At Inter-section	% Between Inter-section	% "T" Junct-ion	% Bridge	% Other
White Rock	78	47.4	39.7	5.1	0.0	7.7
Deas Isle Freeway Patrol (Unit A)	141	9.2	48.2	0.0	13.5	29.1
Port Mann Freeway Patrol (Unit B)	344	5.8	51.2	1.5	25.3	16.3
VICTORIA SUB-DIVISION						
Chemainus	30	33.3	53.3	3.3	6.7	3.3
Colwood	241	37.3	41.1	12.9	1.2	7.5
Duncan	109	33.0	49.5	11.9	0.9	4.6
Duncan - North Cowichan	103	33.0	48.5	11.7	1.9	4.9
Gabriola Island	22	36.4	54.5	9.1	0.0	0.0
Ganges	34	23.5	61.8	11.8	0.0	2.9
Ladysmith	54	29.6	61.1	5.6	0.0	3.7
Lake Cowichan	36	13.9	80.6	2.8	2.8	0.0
Nanaimo Rural	49	30.6	55.1	6.1	8.2	0.0
Nanaimo Municipal	454	54.6	30.6	9.0	0.7	5.1
Pender Island	10	0.0	80.0	10.0	0.0	10.0
Shawnigan Lake	73	43.8	50.7	2.7	0.0	2.7
Sidney Rural	7	28.6	42.9	0.0	0.0	28.6
Sidney Municipal	71	59.2	33.8	2.8	0.0	4.2
Sooke	80	20.0	63.8	3.8	3.8	8.8

Types of Casualty Motor Vehicle Crashes in British Columbia, 1985

TYPES OF CASUALTY MOTOR VEHICLE CRASHES IN BRITISH COLUMBIA, 1985

This report consists of a breakdown of the types of casualty accidents (i.e. a crash where someone was injured or killed.) Each of type was extracted from the Traffic Accident Report forms (MV 104) which were submitted to the Motor Vehicle Department of the Ministry of Transportation and Highways by the police department/detachment servicing the location of the crash. It should be noted that as these computer-based files are constantly being updated by the Motor Vehicle Department, any figures produced by that department which contradict figures reported herein ought to be considered correct.

In order to interpret the information in this report, two things need to be kept in mind:

1) In most police departments/detachments, the actual number of casualty accidents is very small, so that a difference of one or two accidents can produce a very large percentage figure. Such large percentages based on a small number of accidents should not be taken as indicating any sort of trend or stable condition. They are most probably entirely random variations from police jurisdiction to police jurisdiction.

2) The type codes should be considered in the light of the provincial figures, and these are presented on the first page of the report.

TYPES OF CASUALTY MOTOR VEHICLE CRASHES, BRITISH COLUMBIA, 1985

LOCATION	No. of Crashes	Multiple Veh.		Single Motor Vehicle Collisions													
		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown	% Hit and Run	% Commercial Vehicle	% Out of Prov. Driver
BRITISH COLUMBIA	25,155	54.8%	3.3%	7.5%	6.2%	0.9%	3.2%	0.8%	1.1%	1.1%	6.4%	1.6%	3.0%	10.1%	4.3%	5.1%	7.4%
INDEPENDENT POLICE FORCES																	
Central Saanich	81	49.4%	3.7%	3.7%	4.9%	0.0%	11.1%	2.5%	1.2%	1.2%	4.9%	0.0%	3.7%	13.6%	3.7%	3.7%	3.7%
Delta Municipal	408	55.9%	2.0%	6.9%	10.3%	0.7%	6.9%	0.2%	0.2%	2.0%	5.6%	0.7%	2.0%	6.6%	5.4%	3.7%	4.7%
Esquimalt	96	50.0%	5.2%	11.5%	21.9%	0.0%	2.1%	0.0%	2.1%	1.0%	0.0%	0.0%	2.1%	4.2%	9.4%	2.1%	6.3%
Matsqui	423	57.2%	3.1%	7.6%	4.0%	0.7%	4.7%	0.7%	0.2%	1.4%	8.7%	0.9%	2.6%	8.0%	4.7%	3.1%	4.5%
Nelson City	28	50.0%	7.1%	14.3%	7.1%	0.0%	7.1%	0.0%	7.1%	0.0%	0.0%	0.0%	0.0%	7.1%	7.1%	3.6%	3.6%
New Westminster	500	72.8%	3.6%	10.4%	2.0%	0.0%	3.6%	0.2%	0.0%	1.6%	0.0%	0.4%	2.6%	2.8%	7.0%	6.2%	5.4%
Oak Bay	67	49.3%	7.5%	7.5%	14.9%	0.0%	9.0%	0.0%	3.0%	3.0%	0.0%	0.0%	3.0%	3.0%	0.0%	3.0%	3.0%
Port Moody	112	72.3%	5.4%	4.5%	2.7%	0.0%	2.7%	0.0%	0.9%	2.7%	0.0%	0.9%	2.7%	5.4%	7.1%	4.5%	2.7%
Saanich	515	56.1%	2.3%	7.0%	12.0%	0.4%	5.4%	0.0%	2.1%	1.6%	1.9%	1.2%	2.7%	7.2%	4.7%	2.3%	5.0%
Vancouver City	4,638	68.4%	3.8%	14.5%	7.6%	0.2%	1.5%	0.2%	0.4%	0.8%	0.1%	0.2%	1.1%	1.2%	6.0%	3.4%	7.0%
Victoria City	668	56.0%	4.8%	10.2%	15.6%	0.1%	3.7%	0.1%	0.4%	2.4%	0.0%	0.3%	2.1%	4.2%	7.6%	1.8%	7.2%
W. Vancouver	298	60.7%	2.0%	5.0%	5.7%	0.3%	2.0%	3.4%	2.0%	1.3%	2.3%	2.0%	4.4%	8.7%	2.3%	4.0%	4.7%
FEDERAL AGENCIES																	
Military Police	6	0.0%	0.0%	16.7%	0.0%	0.0%	33.3%	0.0	0.0	16.7%	0.0%	16.7%	16.7%	0.0%	0.0%	0.0%	0.0%
National Harbours Board	5	40.0%	0.0%	40.0%	0.0%	0.0%	0.0%	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	20.0%	0.0%
ROYAL CANADIAN MOUNTED POLICE																	
AUTONOMOUS DETACHMENTS																	
Burnaby	1,553	72.8%	4.0%	7.4%	4.2%	0.2%	3.2%	0.3%	0.3%	1.5%	1.0%	0.4%	1.3%	3.4%	5.9%	4.6%	4.6%
Coquitlam Rural	85	68.2%	0.0%	0.0%	4.7%	0.0%	1.2%	1.2%	1.2%	3.5%	4.7%	5.9%	3.5%	5.9%	9.4%	11.8%	10.6%
Coquitlam Municipal	420	64.0%	5.5%	7.4%	4.3%	0.0%	5.2%	0.5%	0.7%	1.4%	3.3%	2.1%	1.9%	3.6%	4.8%	4.5%	4.5%
Port Coquitlam	190	63.7%	2.6%	5.3%	5.3%	0.5%	7.9	0.5%	1.1%	1.1%	3.7%	1.1%	5.3%	2.1%	4.2%	6.3%	3.7%
North Vancouver City	270	71.5%	4.1%	11.1%	8.9%	0.0%	1.5%	0.0%	0.4%	0.4%	0.0%	0.0%	0.7%	1.5%	8.5%	4.4%	7.4%
North Vancouver District	306	60.1%	3.3%	10.5%	9.2%	0.0%	4.9%	0.7%	2.0%	1.0%	1.6%	0.3%	2.3%	4.2%	3.6%	2.9%	3.9%
Richmond Township	869	65.8%	3.7%	7.6%	8.9%	0.0%	2.8%	0.7%	0.3%	1.2%	2.5%	0.6%	2.5%	3.5%	2.6%	3.7%	6.4%
Surrey	1,756	68.4%	4.1%	6.2%	4.8%	0.4%	3.3%	0.2%	0.8%	1.1%	5.2%	0.5%	1.6%	3.4%	6.0%	4.6%	4.8%

TYPES OF CASUALTY MOTOR VEHICLE CRASHES, BRITISH COLUMBIA, 1985

LOCATION	No. of Crashes	Multiple Veh.		Single Motor Vehicle Collisions											% Hit and Run	% Commercial Vehicle	% Out of Prov. Driver
		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown			
CHILLIWACK SUB-DIVISION																	
Abbotsford Rural	4	50.0%	0.0%	0.0%	0.0%	0.0%	0.0%	25.0%	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Abbotsford Municipal	130	51.5%	3.1%	8.5%	3.1%	0.0%	8.5%	0.8%	0.8%	0.0%	10.0%	1.5%	3.1%	9.2%	5.4%	3.1%	4.6%
Agassiz	70	35.7%	1.4%	0.0%	1.4%	2.9%	7.1%	0.0%	1.4%	0.0%	4.3%	2.9%	7.1%	35.7%	2.9%	5.7%	7.1%
Boston Bar	46	30.4%	0.0%	2.2%	0.0%	6.5%	0.0%	4.3%	4.3%	2.2%	15.2%	0.0%	8.7%	26.1%	2.2%	23.9%	21.7%
Chilliwack Rural	36	13.9%	0.0%	2.8%	5.6%	0.0%	0.0%	0.0%	16.7%	0.0%	27.8%	2.8%	8.3%	22.2%	5.6%	2.8%	8.3%
Chilliwack Municipal	332	47.0%	3.6%	8.1%	11.4%	0.0%	6.9%	0.6%	1.8%	0.3%	3.9%	1.2%	4.8%	10.2%	4.5%	4.8%	3.3%
Hope	149	39.6%	0.0%	1.3%	0.7%	0.0%	0.7%	3.4%	0.7%	0.0%	14.1%	4.0%	7.4%	28.2%	0.7%	15.4%	12.8%
Mission Rural	41	22.0%	0.0%	0.0%	2.4%	0.0%	12.2%	0.0%	7.3%	0.0%	14.6%	7.3%	2.4%	31.7%	4.9%	2.4%	4.9%
Mission Municipal	122	45.9%	3.3%	7.4%	9.0%	0.8%	4.1%	0.8%	4.9%	0.8%	7.4%	0.8%	3.3%	11.5%	3.3%	3.3%	5.7%
Sumas Freeway Patrol (Unit C)	94	26.6%	1.1%	1.1%	0.0%	0.0%	5.3%	6.4%	0.0%	0.0%	18.1%	2.1%	8.5%	30.9%	4.3%	17.0%	9.6%
COURTENAY SUB-DIVISION																	
Alert Bay	13	15.4%	0.0%	15.4%	15.4%	7.7%	0.0%	0.0%	7.7%	0.0%	7.7%	7.7%	7.7%	15.4%	0.0%	15.4%	0.0%
Campbell River Rural	108	23.1%	5.6%	1.9%	3.7%	0.9%	2.8%	0.0%	2.8%	0.9%	8.3%	2.8%	2.8%	44.4%	2.8%	5.6%	7.4%
Campbell River Municipal	146	61.6%	3.4%	8.9%	4.1%	0.0%	2.1%	2.1%	0.0%	0.0%	0.7%	2.7%	2.1%	12.3%	1.4%	4.8%	2.1%
Comox Municipal	24	54.2%	8.3%	4.2%	8.3%	0.0%	16.7%	0.0%	0.0%	0.0%	4.2%	0.0%	0.0%	4.2%	0.0%	4.2%	8.3%
Courtenay Rural	158	34.2%	4.4%	3.2%	3.2%	1.3%	1.3%	0.0%	3.8%	0.0%	18.4%	4.4%	3.2%	22.8%	3.2%	5.7%	5.1%
Courtenay Municipal	107	56.1%	4.7%	11.2%	11.2%	0.0%	3.7%	0.9%	0.9%	0.0%	1.9%	0.0%	1.9%	7.5%	8.4%	5.6%	2.8%
Gold River	18	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	33.3%	5.6%	11.1%	33.3%	0.0%	16.7%	5.6%
Parksville	160	40.6%	1.9%	5.6%	3.8%	1.9%	3.8%	0.0%	1.9%	1.9%	10.6%	1.9%	2.5%	23.8%	0.6%	3.1%	3.1%
Port Alberni Rural	70	21.4%	0.0%	0.0%	4.3%	2.9%	1.4%	0.0%	4.3%	0.0%	28.6%	7.1%	8.6%	21.4%	0.0%	4.3%	8.6%
Port Alberni Municipal	118	62.7%	3.4%	11.9%	4.2%	0.0%	5.9%	0.8%	1.7%	1.7%	1.7%	0.8%	2.5%	2.5%	5.1%	2.5%	1.7%
Port Alice	10	20.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	10.0%	60.0%	0.0%	0.0%	0.0%
Port Hardy	69	36.2%	5.8%	4.3%	0.0%	1.4%	1.4%	0.0%	2.9%	0.0%	20.3%	7.2%	1.4%	18.8%	2.9%	0.0%	10.1%
Port McNeill	44	6.8%	0.0%	4.5%	4.5%	4.5%	0.0%	2.3%	0.0%	2.3%	29.5%	2.3%	4.5%	38.6%	0.0%	6.8%	6.8%
Powell River Rural	40	22.5%	5.0%	7.5%	2.5%	0.0%	2.5%	2.5%	5.0%	0.0%	25.0%	2.5%	5.0%	20.0%	2.5%	2.5%	2.5%
Powell River Municipal	55	38.2%	9.1%	3.6%	7.3%	0.0%	5.5%	1.8%	1.8%	5.5%	5.5%	5.5%	3.6%	12.7%	9.1%	1.8%	7.3%
Quadra Island	10	20.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	20.0%	0.0%	40.0%	0.0%	10.0%	0.0%	0.0%	0.0%	20.0%
Sayward	24	0.0%	4.2%	4.2%	0.0%	12.5%	4.2%	0.0%	4.2%	0.0%	12.5%	4.2%	8.3%	45.8%	0.0%	4.2%	0.0%

TYPES OF CASUALTY MOTOR VEHICLE CRASHES, BRITISH COLUMBIA, 1985

LOCATION	No. of Crashes	Multiple Veh.		Single Motor Vehicle Collisions											% Hit and Run	% Commercial Vehicle	% Out of Prov. Driver
		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown			
COURTENAY SUB-DIVISION cont'																	
Tahsis	11	27.3%	9.1%	0.0%	9.1%	0.0%	0.0%	9.1%	0.0%	0.0%	0.0%	27.3%	9.1%	9.1%	0.0%	0.0%	0.0%
Tofino	10	40.0%	0.0%	10.0%	0.0%	0.0%	0.0%	0.0%	10.0%	0.0%	10.0%	0.0%	0.0%	30.0%	0.0%	10.0%	10.0%
Ucluelet	34	38.2%	2.9%	5.9%	0.0%	2.9%	2.9%	0.0%	2.9%	0.0%	20.6%	2.9%	2.9%	17.6%	2.9%	8.8%	8.8%
Texada Island	6	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	16.7%	33.3%	0.0%	0.0%	0.0%	0.0%	0.0%
KAMLOOPS SUB-DIVISION																	
Alexis Creek	21	23.8%	0.0%	0.0%	4.8%	9.5%	0.0%	0.0%	0.0%	0.0%	23.8%	4.8%	14.3%	19.0%	0.0%	9.5%	4.8%
Anahim Lake	16	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	6.3%	0.0%	50.0%	12.5%	6.3%	18.8%	0.0%	0.0%	6.3%
Ashcroft	44	29.5%	4.5%	4.5%	0.0%	2.3%	2.3%	0.0%	0.0%	0.0%	13.6%	2.3%	11.4%	29.5%	0.0%	9.1%	11.4%
Barriere	32	21.9%	0.0%	3.1%	6.3%	0.0%	0.0%	0.0%	0.0%	0.0%	31.3%	6.3%	6.3%	25.0%	0.0%	9.4%	25.0%
Chase	61	19.7%	0.0%	0.0%	0.0%	1.6%	4.9%	0.0%	3.3%	3.3%	23.0%	8.2%	3.3%	32.8%	0.0%	11.5%	14.8%
Clearwater	52	28.8%	1.9%	0.0%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	13.5%	7.7%	3.8%	36.5%	0.0%	26.9%	23.1%
Clinton	46	19.6%	2.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	17.4%	0.0%	8.7%	52.2%	0.0%	2.2%	4.3%
100 Mile House	108	21.3%	0.9%	4.6%	3.7%	3.7%	0.0%	0.0%	1.9%	0.0%	2.8%	4.6%	0.0%	56.5%	2.8%	9.3%	6.5%
Kamloops Rural	90	21.1%	0.0%	1.1%	1.1%	3.3%	4.4%	0.0%	1.1%	0.0%	15.6%	5.6%	4.4%	42.2%	1.1%	12.2%	14.4%
Kamloops Municipal	451	59.6%	2.0%	6.0%	7.5%	0.7%	3.3%	0.4%	1.1%	1.8%	5.5%	2.2%	4.0%	5.8%	3.5%	3.5%	5.3%
Lillooet	56	23.2%	0.0%	0.0%	0.0%	3.6%	1.8%	0.0%	1.8%	0.0%	16.1%	5.4%	10.7%	37.5%	0.0%	10.7%	0.0%
Logan Lake	18	5.6%	5.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	11.1%	0.0%	0.0%	77.8%	0.0%	5.6%	5.6%
Lytton	32	40.6%	0.0%	0.0%	6.3%	3.1%	0.0%	3.1%	0.0%	3.1%	9.4%	3.1%	12.5%	18.8%	3.1%	15.6%	28.1%
Merritt Rural	58	20.7%	0.0%	6.9%	3.4%	1.7%	5.2%	0.0%	1.7%	0.0%	19.0%	6.9%	3.4%	31.0%	0.0%	12.1%	6.9%
Merritt Municipal	31	38.7%	0.0%	16.1%	16.1%	0.0%	9.7%	0.0%	0.0%	0.0%	6.5%	3.2%	3.2%	6.5%	6.5%	3.2%	6.5%
Spences Bridge	27	22.2%	0.0%	3.7%	0.0%	3.7%	0.0%	0.0%	0.0%	7.4%	11.1%	3.7%	25.9%	22.2%	7.4%	29.6%	29.6%
Valemount	37	10.8%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	27.0%	2.7%	8.1%	51.4%	0.0%	21.6%	40.5%
Williams Lake Rural	132	31.8%	2.3%	1.5%	0.0%	4.5%	0.8%	0.0%	0.0%	0.0%	20.5%	3.8%	0.0%	34.8%	1.5%	11.4%	6.1%
Williams Lake Municipal	95	49.5%	6.3%	5.3%	9.5%	0.0%	2.1%	2.1%	2.1%	3.2%	7.4%	3.2%	1.1%	8.4%	5.3%	3.2%	3.2%
KELOWNA SUB-DIVISION																	
Armstrong	40	35.0%	0.0%	2.5%	2.5%	0.0%	5.0%	0.0%	5.0%	2.5%	30.0%	7.5%	2.5%	7.5%	5.0%	2.5%	10.0%
Enderby	33	36.4%	0.0%	0.0%	3.0%	0.0%	6.1%	0.0%	3.0%	0.0%	12.1%	0.0%	6.1%	33.3%	3.0%	6.1%	15.2%
Faulkland	18	22.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	44.4%	0.0%	0.0%	33.3%	0.0%	22.2%	11.1%
Kelowna Rural	192	41.1%	2.6%	3.6%	1.6%	3.1%	1.0%	2.1%	1.6%	1.6%	13.0%	4.2%	5.7%	18.8%	0.5%	7.3%	14.6%
Kelowna Municipal	490	57.6%	4.9%	5.9%	10.2%	1.0%	3.9%	0.6%	0.6%	1.2%	4.3%	0.4%	2.7%	6.7%	3.7%	3.5%	7.1%

TYPES OF CASUALTY MOTOR VEHICLE CRASHES, BRITISH COLUMBIA, 1985

LOCATION	No. of Crashes	Multiple Veh.		Single Motor Vehicle Collisions													
		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown	% Hit and Run	% Commercial Vehicle	% Out of Prov. Driver
KELOWNA SUB-DIVISION cont'																	
Keremeos	46	32.6%	0.0%	2.2%	2.2%	2.2%	4.3%	0.0%	6.5%	0.0%	13.0%	15.2%	10.9%	10.9%	4.3%	6.5%	21.7%
Lumby	29	17.2%	3.4%	3.4%	3.4%	3.4%	3.4%	0.0%	0.0%	0.0%	27.6%	3.4%	3.4%	31.0%	0.0%	10.3%	13.8%
Oliver	35	34.3%	2.9%	0.0%	14.3%	5.7%	2.9%	2.9%	2.9%	0.0%	8.6%	2.9%	8.6%	14.3%	0.0%	5.7%	14.3%
Osoyoos	47	44.7%	6.4%	0.0%	6.4%	2.1%	10.6%	0.0%	2.1%	0.0%	17.0%	4.3%	4.3%	2.1%	4.3%	2.1%	27.7%
Penticton Rural	67	37.3%	6.0%	0.0%	4.5%	1.5%	1.5%	3.0%	0.0%	0.0%	14.9%	4.5%	3.9%	23.9%	1.5%	4.5%	13.4%
Penticton Municipal	200	54.0%	5.5%	5.5%	10.5%	1.0%	4.0%	0.0%	0.5%	1.0%	3.0%	1.5%	2.0%	11.5%	6.5%	1.0%	9.0%
Princeton	89	27.0%	2.2%	1.1%	2.2%	0.0%	2.2%	0.0%	1.1%	3.4%	10.1%	5.6%	10.1%	34.8%	2.2%	12.4%	12.4%
Revelstoke	119	38.7%	1.7%	0.8%	4.2%	2.5%	2.5%	0.0%	2.5%	0.0%	9.2%	10.1%	8.4%	19.3%	2.5%	11.8%	23.5%
Salmon Arm Rural	37	27.0%	2.7%	2.7%	0.0%	0.0%	2.7%	0.0%	0.0%	0.0%	35.1%	2.7%	2.7%	24.3%	0.0%	0.0%	13.5%
Salmon Arm Municipal	69	37.7%	4.3%	2.9%	5.8%	1.4%	1.4%	1.4%	0.0%	2.9%	18.8%	2.9%	5.8%	14.5%	2.9%	5.8%	10.1%
Sicamous	51	29.4%	2.0%	2.0%	0.0%	2.0%	2.0%	2.0%	2.0%	2.0%	31.4%	2.0%	7.8%	15.7%	0.0%	23.5%	29.4%
Summerland Municipal	37	35.1%	8.1%	2.7%	2.7%	0.0%	5.4%	5.4%	0.0%	0.0%	10.8%	8.1%	5.4%	16.2%	0.0%	8.1%	2.7%
Vernon Rural	117	33.3%	6.8%	0.9%	6.0%	0.9%	8.5%	0.0%	4.3%	0.9%	12.0%	3.4%	0.9%	22.2%	1.7%	1.7%	8.5%
Vernon Municipal	212	59.0%	4.2%	11.3%	9.4%	0.0%	2.8%	0.9%	0.9%	0.0%	1.9%	1.4%	2.4%	5.7%	2.8%	2.8%	8.0%
NELSON SUB-DIVISION																	
Castlegar Rural	45	37.8%	2.2%	2.2%	8.9%	4.4%	0.0%	0.0%	2.2%	0.0%	8.9%	2.2%	4.4%	26.7%	0.0%	4.4%	11.1%
Castlegar Municipal	38	68.4%	0.0%	2.6%	10.5%	2.6%	2.6%	0.0%	2.6%	0.0%	5.3%	0.0%	0.0%	5.3%	0.0%	2.6%	2.6%
Cranbrook Rural	55	21.8%	0.0%	1.8%	0.0%	7.3%	3.6%	3.6%	5.5%	0.0%	9.1%	5.5%	3.6%	38.2%	1.8%	5.5%	10.9%
Cranbrook Municipal	64	48.4%	4.7%	12.5%	4.7%	0.0%	4.7%	0.0%	0.0%	1.6%	3.1%	0.0%	6.3%	14.1%	1.6%	3.1%	4.7%
Crescent Valley	40	27.5%	5.0%	0.0%	2.5%	0.0%	0.0%	2.5%	0.0%	0.0%	7.5%	5.0%	5.0%	45.0%	0.0%	5.0%	5.0%
Creston	74	24.3%	1.4%	1.4%	5.4%	8.1%	4.1%	1.4%	1.4%	0.0%	17.6%	5.4%	9.5%	20.3%	1.4%	8.1%	18.9%
Elkford	13	15.4%	0.0%	0.0%	7.7%	0.0%	23.1%	7.7%	0.0%	15.4%	30.8%	0.0%	0.0%	0.0%	0.0%	0.0%	15.4%
Fernie	49	34.7%	2.0%	8.2%	4.1%	8.2%	0.0%	0.0%	2.0%	4.1%	6.1%	6.1%	2.0%	22.4%	0.0%	12.2%	22.4%
Field	14	28.6%	7.1%	7.1%	0.0%	14.3%	0.0%	7.1%	0.0%	0.0%	7.1%	7.1%	0.0%	21.4%	0.0%	7.1%	71.4%
Fruitvale	26	19.2%	7.7%	7.7%	7.7%	0.0%	3.8%	3.8%	0.0%	0.0%	11.5%	3.8%	11.5%	23.1%	0.0%	11.5%	3.8%
Golden	89	25.8%	3.4%	2.2%	0.0%	3.4%	2.2%	4.5%	1.1%	0.0%	18.0%	12.4%	5.6%	21.3%	0.0%	19.1%	38.2%
Grand Forks	65	16.9%	3.1%	3.1%	3.1%	6.2%	1.5%	0.0%	1.5%	1.5%	10.8%	4.6%	9.2%	38.5%	0.0%	6.2%	7.7%
Invermere	53	28.3%	0.0%	0.0%	7.5%	1.9%	0.0%	3.8%	3.8%	0.0%	17.0%	3.8%	1.9%	32.1%	0.0%	3.8%	30.2%
Kaslo	17	29.4%	0.0%	0.0%	0.0%	23.5%	0.0%	0.0%	0.0%	0.0%	17.6%	0.0%	11.8%	17.6%	5.9%	0.0%	17.6%
Kimberley Rural	21	19.0%	9.5%	0.0%	0.0%	9.5%	0.0%	0.0%	0.0%	0.0%	14.3%	4.8%	4.8%	38.1%	0.0%	0.0%	28.6%
Kimberley Municipal	18	44.4%	0.0%	0.0%	11.1%	0.0%	5.6%	5.6%	0.0%	0.0%	5.6%	11.1%	11.1%	5.6%	11.1%	5.6%	11.1%

TYPES OF CASUALTY MOTOR VEHICLE CRASHES, BRITISH COLUMBIA, 1985

LOCATION	No. of Crashes	Multiple Veh.		Single Motor Vehicle Collisions											% Hit and Run	% Commercial Vehicle	% Out of Prov. Driver
		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown			
NELSON SUB-DIVISION cont'																	
Midway	30	16.7%	0.0%	0.0%	0.0%	3.3%	3.3%	0.0%	3.3%	0.0%	30.0%	0.0%	16.7%	26.7%	0.0%	3.3%	3.3%
Nakusp	27	18.5%	0.0%	0.0%	7.4%	0.0%	0.0%	7.4%	3.7%	0.0%	18.5%	3.7%	7.4%	33.3%	0.0%	7.4%	7.4%
Nelson	35	20.0%	5.7%	0.0%	0.0%	8.6%	0.0%	5.7%	2.9%	8.6%	11.4%	5.7%	5.7%	25.7%	0.0%	2.9%	8.6%
New Denver	12	33.3%	0.0%	0.0%	0.0%	16.7%	0.0%	25.0%	0.0%	0.0%	16.7%	0.0%	8.3%	0.0%	8.3%	0.0%	16.7%
Radium	32	21.9%	0.0%	0.0%	3.1%	15.6%	3.1%	9.4%	3.1%	0.0%	18.8%	0.0%	0.0%	25.0%	0.0%	12.5%	65.6%
Rossland	21	14.3%	0.0%	9.5%	0.0%	14.3%	0.0%	0.0%	4.8%	0.0%	9.5%	0.0%	19.0%	28.6%	4.8%	4.8%	9.5%
Salmo	38	28.9%	0.0%	2.6%	0.0%	2.6%	2.6%	5.3%	2.6%	2.6%	18.4%	10.5%	5.3%	18.4%	2.6%	10.5%	10.5%
Sparwood	40	7.5%	2.5%	5.0%	0.0%	0.0%	2.5%	2.5%	2.5%	0.0%	45.0%	7.5%	12.5%	12.5%	0.0%	5.0%	37.5%
Trail Rural	20	25.0%	5.0%	0.0%	0.0%	5.0%	0.0%	5.0%	15.0%	0.0%	20.0%	10.0%	0.0%	15.0%	0.0%	0.0%	0.0%
Trail Municipal	39	43.6%	7.7%	20.5%	10.3%	0.0%	0.0%	0.0%	0.0%	0.0%	2.6%	0.0%	5.1%	10.3%	0.0%	5.1%	5.1%
PRINCE GEORGE SUB-DIVISION																	
Burns Lake	54	29.6%	0.0%	5.6%	5.6%	5.6%	7.4%	1.9%	1.9%	1.9%	9.3%	11.1%	3.7%	16.7%	1.9%	9.3%	7.4%
Chetwynd	65	26.2%	1.5%	4.6%	0.0%	7.7%	0.0%	1.5%	1.5%	0.0%	13.8%	7.7%	4.6%	30.8%	1.5%	12.3%	13.8%
Dawson Creek Rural	74	29.7%	2.7%	1.4%	0.0%	0.0%	0.0%	1.4%	1.4%	1.4%	33.8%	5.4%	0.0%	23.0%	0.0%	14.9%	24.3%
Dawson Creek Municipal	53	69.8%	1.9%	9.4%	9.4%	0.0%	0.0%	0.0%	1.9%	1.9%	1.9%	0.0%	1.9%	1.9%	7.5%	5.7%	28.3%
Fort Nelson	60	23.3%	5.0%	3.3%	1.7%	1.7%	0.0%	1.7%	1.7%	0.0%	13.3%	5.0%	5.0%	38.3%	1.7%	10.0%	43.3%
Fort St. James	33	24.2%	0.0%	12.1%	3.0%	3.0%	0.0%	0.0%	0.0%	3.0%	30.3%	9.1%	0.0%	15.2%	3.0%	3.0%	0.0%
Fort St. John Rural	70	28.6%	4.3%	2.9%	1.4%	1.4%	0.0%	0.0%	0.0%	1.4%	24.3%	4.3%	2.9%	28.6%	1.4%	17.1%	17.1%
Fort St. John Municipal	54	63.0%	3.7%	7.4%	7.4%	0.0%	0.0%	1.9%	0.0%	1.9%	1.9%	1.9%	0.0%	11.1%	1.9%	7.4%	20.4%
Fraser Lake	26	34.6%	0.0%	0.0%	0.0%	3.8%	0.0%	0.0%	3.8%	0.0%	42.3%	0.0%	7.7%	7.7%	0.0%	0.0%	7.7%
Hudson Hope	13	23.1%	0.0%	15.4%	0.0%	7.7%	0.0%	0.0%	0.0%	0.0%	7.7%	23.1%	0.0%	23.1%	0.0%	0.0%	0.0%
Mackenzie Rural	31	12.9%	0.0%	0.0%	3.2%	6.5%	0.0%	3.2%	0.0%	0.0%	25.8%	3.2%	9.7%	35.5%	0.0%	12.9%	9.7%
Mackenzie Municipal	19	36.8%	0.0%	0.0%	15.8%	5.3%	0.0%	0.0%	0.0%	0.0%	10.5%	5.3%	10.5%	15.8%	0.0%	5.3%	5.3%
McBride	27	18.5%	0.0%	0.0%	0.0%	7.4%	0.0%	0.0%	3.7%	0.0%	37.0%	0.0%	14.8%	18.5%	0.0%	7.4%	33.3%
Prince George Rural	147	21.8%	1.4%	2.0%	0.0%	7.5%	2.0%	0.0%	0.0%	1.4%	24.5%	5.4%	5.4%	28.6%	0.7%	15.6%	8.8%
Prince George City	439	55.1%	1.8%	8.7%	9.3%	0.9%	2.5%	0.5%	0.0%	2.3%	5.2%	1.6%	3.4%	8.7%	5.9%	4.3%	5.7%
Quesnel Rural	121	29.8%	0.0%	2.5%	1.7%	5.0%	1.7%	0.8%	0.8%	0.0%	14.0%	1.7%	3.3%	38.8%	1.7%	8.3%	9.9%
Quesnel Municipal	67	55.2%	0.0%	7.5%	4.5%	1.5%	7.5%	1.5%	0.0%	1.5%	3.0%	3.0%	3.0%	11.9%	4.5%	1.5%	7.5%
Tumbler Ridge	29	24.1%	3.4%	10.3%	0.0%	3.4%	13.8%	0.0%	0.0%	0.0%	17.2%	3.4%	0.0%	24.1%	0.0%	6.9%	17.2%
Vanderhoof	61	29.5%	1.6%	3.3%	6.6%	1.6%	0.0%	0.0%	0.0%	3.3%	24.6%	3.3%	1.6%	24.6%	0.0%	8.2%	8.2%
Watson Lake, Teslin	7	42.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	28.6%	0.0%	28.6%	0.0%	28.6%	71.4%
Wells	14	21.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	21.4%	21.4%	21.4%	14.3%	0.0%	14.3%	21.4%

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		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown			
PRINCE RUPERT SUB-DIVISION																	
Atlin	1	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%
Bella Coola	14	7.1%	0.0%	14.3%	0.0%	0.0%	7.1%	0.0%	0.0%	0.0%	28.6%	0.0%	7.1%	35.7%	0.0%	0.0%	7.1%
Cassiar	14	7.1%	14.3%	7.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	21.4%	0.0%	14.3%	35.7%	0.0%	14.3%	21.4%
Dease Lake	29	17.2%	3.4%	0.0%	0.0%	0.0%	0.0%	0.0%	6.9%	0.0%	48.3%	0.0%	6.9%	17.2%	0.0%	27.6%	34.5%
Granisle	6	0.0%	0.0%	0.0%	0.0%	16.7%	0.0%	0.0%	16.7%	0.0%	66.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Hazelton	58	24.1%	0.0%	8.6%	0.0%	8.6%	0.0%	1.7%	0.0%	0.0%	25.9%	6.9%	1.7%	22.4%	0.0%	8.6%	5.2%
Houston	37	32.4%	0.0%	5.4%	0.0%	8.1%	2.7%	0.0%	0.0%	0.0%	27.0%	2.7%	0.0%	21.6%	0.0%	16.2%	0.0%
Kitimat Rural	16	25.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	12.5%	6.3%	6.3%	50.0%	0.0%	0.0%	0.0%
Kitimat Municipal	28	46.4%	3.6%	0.0%	7.1%	0.0%	7.1%	0.0%	0.0%	0.0%	14.3%	0.0%	0.0%	21.4%	0.0%	0.0%	0.0%
Masset	21	14.3%	0.0%	9.5%	0.0%	0.0%	0.0%	0.0%	9.5%	4.8%	42.9%	0.0%	4.8%	14.3%	0.0%	0.0%	4.8%
New Alyansh	6	16.7%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	16.7%	16.7%	0.0%	50.0%	0.0%	33.3%	0.0%
Prince Rupert Rural	28	14.3%	0.0%	7.1%	3.6%	0.0%	0.0%	3.6%	0.0%	0.0%	35.7%	3.6%	3.6%	28.6%	3.6%	7.1%	17.9%
Prince Rupert City	81	32.1%	2.5%	29.6%	6.2%	1.2%	2.5%	2.5%	0.0%	0.0%	7.4%	0.0%	3.7%	12.3%	8.6%	0.0%	4.9%
Queen Charlotte	19	5.3%	0.0%	5.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	21.1%	5.3%	10.5%	52.6%	0.0%	5.3%	0.0%
Smithers	77	32.5%	5.2%	3.9%	1.3%	1.3%	9.1%	0.0%	0.0%	0.0%	16.9%	3.9%	7.8%	18.2%	0.0%	6.5%	7.8%
Stewart	24	20.8%	0.0%	0.0%	0.0%	0.0%	4.2%	8.3%	4.2%	0.0%	25.0%	0.0%	4.2%	33.3%	0.0%	25.0%	54.2%
Terrace Rural	67	26.9%	0.0%	3.0%	1.5%	3.0%	0.0%	3.0%	0.0%	1.5%	22.4%	3.0%	7.5%	28.4%	0.0%	9.0%	4.5%
Terrace Municipal	66	43.9%	4.5%	13.6%	15.2%	0.0%	3.0%	1.5%	1.5%	0.0%	4.5%	0.0%	3.0%	9.1%	6.1%	1.5%	1.5%
VANCOUVER SUB-DIVISION																	
Gibsons	52	30.8%	9.6%	3.8%	0.0%	3.8%	7.7%	0.0%	3.8%	1.9%	11.5%	0.0%	3.8%	23.1%	3.8%	3.8%	3.8%
Langley City	190	65.3%	4.7%	7.4%	9.5%	0.0%	2.1%	0.0%	0.0%	2.1%	3.2%	0.5%	1.1%	4.2%	5.8%	2.6%	4.2%
Langley Township	430	50.7%	4.4%	4.2%	6.3%	0.2%	3.3%	0.2%	1.4%	0.2%	12.1%	0.5%	4.2%	12.3%	3.5%	6.0%	4.0%
Maple Ridge Rural	49	53.1%	4.1%	2.0%	2.0%	0.0%	4.1%	0.0%	0.0%	2.0%	26.5%	2.0%	2.0%	2.0%	0.0%	2.0%	2.0%
Maple Ridge Municipal	218	56.0%	4.1%	6.0%	4.6%	0.0%	7.3%	0.5%	2.3%	0.0%	11.0%	0.0%	1.8%	6.4%	1.8%	4.6%	3.7%
Pemberton	25	20.0%	0.0%	0.0%	0.0%	4.0%	4.0%	0.0%	0.0%	0.0%	16.0%	4.0%	0.0%	52.0%	0.0%	8.0%	0.0%
Sechelt	48	31.3%	2.1%	0.0%	6.3%	2.1%	2.1%	2.1%	0.0%	2.1%	16.7%	2.1%	2.1%	31.3%	4.2%	2.1%	2.1%
Squamish Rural	64	29.7%	0.0%	3.1%	1.6%	1.6%	0.0%	1.6%	0.0%	1.6%	21.9%	1.6%	12.5%	25.0%	1.6%	1.6%	7.8%
Squamish Municipal	74	35.1%	5.4%	9.5%	10.8%	1.4%	2.7%	5.4%	2.7%	2.7%	6.8%	0.0%	1.4%	16.2%	4.1%	5.4%	5.4%
University	60	43.3%	5.0%	5.0%	8.3%	1.7%	10.0%	0.0%	1.7%	10.0%	5.0%	0.0%	6.7%	3.3%	3.3%	5.0%	6.7%
Vancouver-Bowen Island	9	33.3%	0.0%	0.0%	0.0%	0.0%	11.1%	0.0%	0.0%	0.0%	33.3%	0.0%	0.0%	22.2%	0.0%	0.0%	0.0%
Whistler	37	32.4%	2.7%	5.4%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	18.9%	5.4%	5.4%	29.7%	0.0%	13.5%	5.4%

LOCATION	No. of Crashes	TYPES OF CASUALTY MOTOR VEHICLE CRASHES, BRITISH COLUMBIA, 1985														
		Multiple Veh.		Single Motor Vehicle Collisions												
		% Other Veh.	% Motor cycle	% Pedes-trian	% Bike	% Animal	% Light/ Util.	% Guard Rail	% Tree	% Curb	% Ditch	% Over turn	% Other	% Unknown	% Hit and Run	% Commercial Vehicle	% Out of Prov. Driver
VANCOUVER SUB-DIVISION cont'																
White Rock	80	52.5%	5.0%	15.0%	11.3%	0.0%	1.3%	0.0%	1.3%	1.3%	5.0%	0.0%	6.3%	1.3%	3.8%	0.0%	2.5%
Deas Isle Freeway Patrol (Unit A)	145	69.0%	2.1%	2.1%	0.0%	0.7%	2.1%	4.8%	0.0%	2.1%	2.1%	2.1%	4.1%	9.0%	8.3%	9.0%	13.1%
Port Mann Freeway Patrol (Unit B)	345	68.7%	0.6%	0.6%	0.0%	0.0%	1.7%	4.9%	0.0%	2.0%	4.3%	2.0%	6.4%	8.7%	4.9%	9.3%	8.7%
VICTORIA SUB-DIVISION																
Chemainus	31	38.7%	6.5%	0.0%	0.0%	0.0%	16.1%	0.0%	6.5%	3.2%	16.1%	0.0%	3.2%	9.7%	0.0%	3.2%	0.0%
Colwood	244	52.0%	0.8%	3.3%	11.9%	2.0%	2.5%	0.8%	2.5%	0.4%	4.1%	1.6%	3.7%	14.3%	4.9%	4.5%	5.3%
Duncan	115	47.8%	0.9%	2.6%	7.8%	0.0%	7.0%	0.9%	3.5%	0.9%	4.3%	1.7%	0.9%	21.7%	3.5%	3.5%	2.6%
Duncan - North Cowichan	104	36.5%	2.9%	1.0%	7.7%	1.9%	5.8%	0.0%	2.9%	1.0%	3.8%	2.9%	3.8%	29.8%	3.8%	3.8%	5.8%
Gabriola Island	22	36.4%	0.0%	0.0%	9.1%	0.0%	4.5%	0.0%	13.6%	0.0%	0.0%	4.5%	9.1%	22.7%	0.0%	0.0%	0.0%
Ganges	34	29.4%	2.9%	5.9%	11.8%	0.0%	0.0%	0.0%	2.9%	0.0%	26.5%	2.9%	5.9%	11.8%	0.0%	5.9%	2.9%
Ladysmith	57	40.4%	0.0%	8.8%	3.5%	0.0%	8.8%	3.5%	0.0%	1.8%	14.0%	3.5%	1.8%	14.0%	3.5%	0.0%	8.8%
Lake Cowichan	40	17.5%	2.5%	5.0%	0.0%	2.5%	5.0%	2.5%	2.5%	0.0%	20.0%	5.0%	0.0%	37.5%	0.0%	5.0%	2.5%
Nanaimo Rural	49	40.8%	0.0%	2.0%	0.0%	2.0%	6.1%	4.1%	8.2%	0.0%	4.1%	0.0%	10.2%	22.4%	0.0%	4.1%	8.2%
Nanaimo Municipal	460	63.7%	4.6%	7.6%	6.7%	0.0%	4.1%	0.2%	1.3%	0.9%	2.8%	0.7%	2.6%	4.8%	4.1%	4.8%	5.4%
Pender Island	11	9.1%	9.1%	0.0%	9.1%	0.0%	9.1%	0.0%	9.1%	0.0%	18.2%	0.0%	9.1%	27.3%	0.0%	0.0%	0.0%
Shawnigan Lake	78	37.2%	1.3%	0.0%	3.8%	2.6%	2.6%	2.6%	1.3%	1.3%	29.5%	2.6%	1.3%	14.1%	2.6%	3.8%	7.7%
Sidney Rural	7	42.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	28.6%	0.0%	0.0%	28.6%	0.0%	0.0%	14.3%
Sidney Municipal	72	58.3%	2.8%	4.2%	5.6%	0.0%	4.2%	1.4%	1.4%	0.0%	5.6%	2.8%	5.6%	8.3%	0.0%	5.6%	6.9%
Sooke	85	28.2%	2.4%	3.5%	4.7%	1.2%	7.1%	2.4%	8.2%	2.4%	14.1%	2.4%	5.9%	17.6%	3.5%	7.1%	10.6%

APPENDIX A

CounterAttack Program Overview

CounterAttack: British Columbia's Anti-Drinking Driving Program

Although many people may not be aware of it, Driving While Impaired is the single most serious and costly criminal activity in British Columbia. Consider the following - in an average year in B.C. about 110 people are murdered, but about 250 people are killed in drinking driving accidents. Further, in an average year in B.C. there are about 450 woundings, yet about 7,200 people are injured in drinking driving accidents. The impact of this crime on the justice system is staggering: about 22,000 persons are charged under the Canadian Criminal Code every year in B.C. at a cost of at least 22 million dollars, and these charges comprise a third of the entire Criminal Code case burden before the courts.

CounterAttack is a crime prevention program aimed directly at reducing drinking driving and the accidents associated with it. Started in 1977, the program is co-funded by the Ministry of Attorney General and the Insurance Corporation of B.C., and has a combined budget of $600,000. Essentially, the program takes three inter-related forms: visible enforcement, public education, and research and evaluation.

Visible Enforcement

Research has shown that visible enforcement is a powerful tool in crime prevention. If people perceive a strong and immediate police presence, they are less likely to commit a crime. Using this principle, the CounterAttack program has assisted the police in their drinking driving "blitz" activities by supplying them with 14 mobile breath testing vans (BATmobiles), by producing media materials to help publicize these blitzes, and by helping the police to co-ordinate and evaluate the blitzes. As a direct result of these blitzes, the level of drinking driving accidents is at its lowest during the Christmas and New Year's period, as can be seen from Figure 1.

In addition to the Christmas roadcheck campaigns which have been held since 1977, the Program has been co-ordinating a Spring roacheck campaign for the past three years. The reason for this latter campaign is that CounterAttack research has identified this period as one of the highest periods of the year for alcohol-related traffic accidents.

Public Information

Public education is a year-round activity for the Counter-Attack Program. Research identifies target populations and television and radio messages are produced and broadcast throughout the year, using a proportion of the beer and wine industry's advertising budget to purchase prime time for airing these messages. Brochures and posters parallel the media messages

FIGURE 1

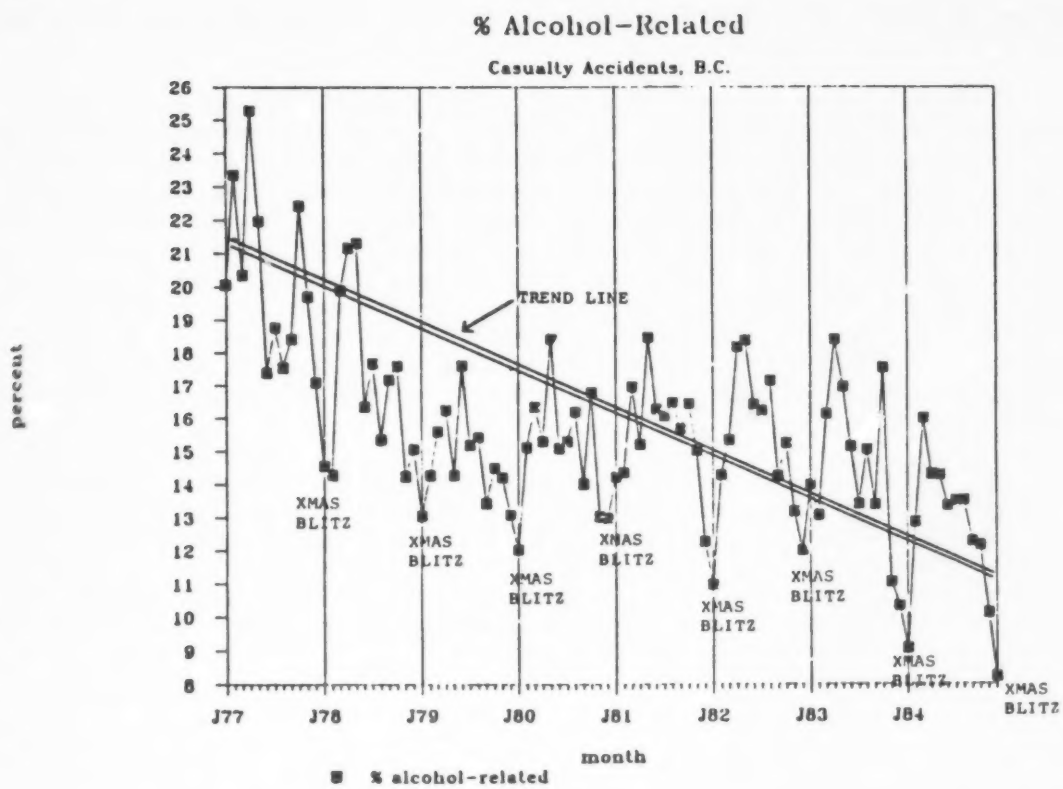
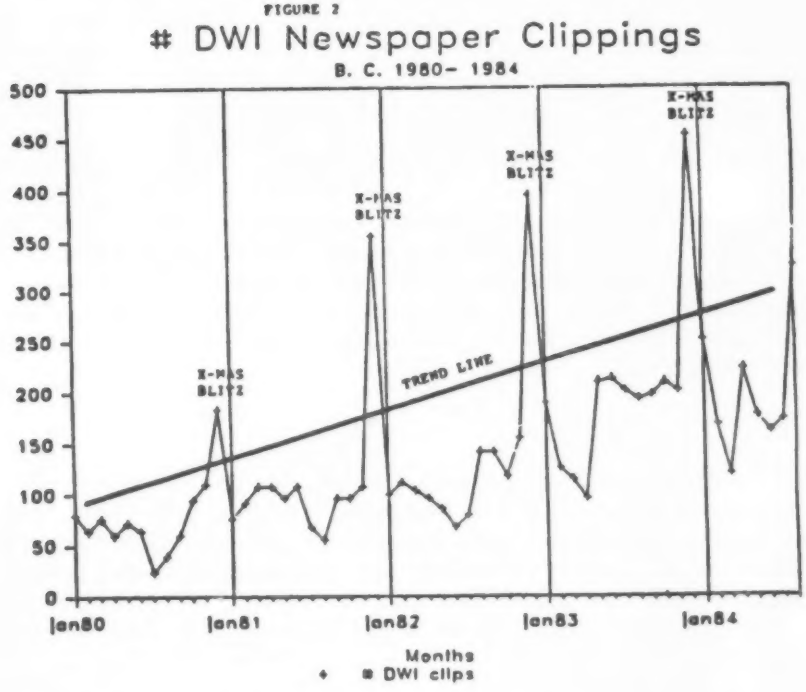


FIGURE 2



and are distributed throughout the province to schools, libraries, the police, liquor stores, and a wide range of special interest groups including the B.C. Medical Association, B.C. Automobile Association, Mothers Against Drunk Driving, and the general public. Further, the Program supplies all schools in the province with drinking driving educational materials in theform of lesson plans, slide presentations, films, videotapes, and so on.

The CounterAttack Program also encourages public participation through the co-ordination of community-based CounterAttack groups, which are brought together at local and province-wide conferences for both adults and students.

One piece of evidence that these efforts are helping to make the public more aware of the seriousness of drinking driving is reflected in the steady increase in press coverage of the issue over the past few years, as shown in Figure 2.

Research and Evaluation

An absolutely essential component of any crime prevention program is the constant evaluation and improvement of that program through research. One example of CounterAttack's research aimed at improving public information stems from a B.C.-wide survey done by the program that found that people were not aware that the penalties for Driving While Impaired could be severe. Based on this, and using the notion that for a law to have a deterrent effect the penalties must be known, Counter-Attack produced television and radio messages telling the public of these penalties. Research findings also directed the public information messages concerning the dangers of riding with a drinking driver and that 75% of the victims of drinking drivers are in the drinking drivers' vehicles.

Overall, the research suggests that since the program began in 1977, the proportion of alcohol-related casualty accidents has been kept to about 10% less than what would have been expected without the program. Each year this translates into a savings of about 30 lives, 850 injuries, and $10 million dollars which would otherwise be paid out in insurance, hospital, and justice system costs. In short, this is a very good return on a $600,000 investment.

Current Situation

The percentage of traffic accidents causing injury and/or death where alcohol was judged to be a significant contributing factor has dropped from about 20% in 1982 to about 12% in 1985. In 1986 CounterAttack will continue to serve on traffic safety committees to assist the police in their drinking driving road-checks, to produce and distribute public education materials and mass media messages, and to research and evaluate traffic safety issues. New initiatives include: the production and

introduction of a comprehensive 700 square foot drinking-driving display for use at EXPO 86 and in shopping centres across the province and six portable display units for community and police use; new public education materials including brochures and posters identifying specific issues; implementation and evaluation of field testing of new Approved Screening Devices in three RCMP subdivisions; introduction of three CounterAttack station wagons to replace retired BATmobiles; 8 regional Student Leader Conferences; and the production of an expanded data base to allow the analyses of traffic accident reports, drivers' records, and coroner's records.

For more information on the CounterAttack Program, please contact:

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Police Services Branch,
Ministry of Attorney General
207 - 815 Hornby Street
Vancouver, B.C. V6Z 2E6
(604) 660-2604

APPENDIX B

Canadian and B.C. Legislation on Drinking Driving

Canadian Criminal Code Legislation

237. Every one commits an offence who operates a motor vehicle or vessel or operates or assists in the operation of an aircraft or has the care or control of a motor vehicle, vessel or aircraft whether it is in motion or not,

(a) while his ability to operate vessel or aircraft is impaired by alcohol or a drug; or

(b) having consumed alcohol in such a quantity that the concentration thereof in his blood exceeds eighty milligrams of alcohol in one hundred millitres of blood.

238. (1) In this section and sections 239 to 241,

"analyst" means a person designated by the Attorney General as an analyst for the purposes of section 241;

"approved container" means

(a) in respect of breath samples, a container of a kind that is designed to receive a sample of the breath of a person for analysis and is approved as suitable for the purposes of section 241 by order of the Attorney General of Canada; and

(b) in respect of blood samples, a container of a kind that is designed to receive a sample of the blood of a person for analysis and is approved as suitable for the purposes of section 241 by order of the Attorney General of Canada;

"approved instrument" means an instrument of a kind that is designed to receive and make an analysis of a sample of the breath of a person in order to measure the concentration of alcohol in the blood of that person and is approved as suitable for the purposes of section 241 by order of the Attorney General of Canada;

"approved screening device" means a device of a kind that is designed to ascertain the presence of alcohol in the blood of a person and that is approved for the purposes of this section by order of the Attorney General of Canada;

"qualified medical practitioner" means a person duly qualified by provincial law to practise medicine;

"qualified technician means,

(a) in respect of breath samples, a person designated by the Attorney General as being qualified to operate an approved instrument, and

(b) in respect of blood samples, any person or person of a class of persons designated by the Attorney General as being qualified to take samples of blood for the purposes of this section and sections 240 and 241.

Canadian Criminal Code Legislation

(2) Where a peace officer reasonably suspects that a person who is operating a motor vehicle or vessel or operating or assisting in the operation of an aircraft or who has the care or control of a motor vehicle, vessel or aircraft, whether it is in motion or not, has alcohol in his body, he may, by demand made to that person, require him to provide forthwith such a sample of his breath as in the opinion of the peace officer is necessary to enable a proper analysis of his breath to be made by means of an approved screening device and, where necessary, to accompany the peace officer for the purpose of enabling such a sample of his breath to be taken.

(3) Where a peace officer believes on reasonable and probable grounds that a person is committing, or at any time within the preceding two hours has committed, as a result of the consumption of alcohol, an offence under section 237, he may, by demand made to that person forthwith or as soon as practicable, require him to provide then or as soon thereafter as is practicable

(a) such samples of his breath as in the opinion of a qualified technician, or

(b) where the peace officer has reasonable and probable grounds to believe that, by reason of any physical condition of the person,

(i) the person may be incapable of providing a sample of his breath, or

(ii) it would be impracticable to obtain a sample of his breath,

such samples of his blood, under the conditions referred to in subsection (4), as in the opinion of the qualified medical practitioner or qualified technician taking the samples

are necessary to enable proper analysis to be made in order to determine the concentration, if any, of alcohol in his blood, and to accompany the peace officer for the purpose of enabling such samples to be taken.

(4) Samples of blood may only be taken from a person pursuant to a demand made by a peace officer under subsection (3) if the samples are taken by or under the direction of a qualified medical practitioner and the qualified medical practitioner is satisfied that the taking of such samples would not endanger the life or health of the person.

(5) Every one commits an offence who, without reasonable excuse, fails or refuses to comply with a demand made to him by a peace officer under this section.

(6) Where a person is convicted or discharged under section 662.1 of an offence committed under subsection (5) for a failure or refusal to comply with a demand made under subsection (3)(a) or (b) in respect of any transaction, he shall not be convicted or discharged under section 662.1 of another offence committed under subsection (5) in respect of the same transaction.

Canadian Criminal Code Legislation

239. (1) Every one who commits an offence under section 237 or 238 is guilty of an indictable offence or an offence punishable on summary conviction and is liable,

(a) whether the offence is prosecuted by indictment or punishable on summary conviction, to the following minimum punishment, namely,

(i) for a first offence, to a fine of not less than three hundred dollars,

(ii) for a second offence, to imprisonment for not less than fourteen days, and

(iii) for each subsequent offence, to imprisonment for not less than ninety days;

(b) where the offence is prosecuted by indictment, to imprisonment for a term not exceeding five years; and

(c) where the offence is punishable on summary conviction, to imprisonment for a term not exceeding six months.

(2) Every one who commits an offence under paragraph 237(a) and thereby causes bodily harm to any other person is guilty of an indictable offence and is liable to imprisonment for a term not exceeding ten years.

(3) Every one who commits an offence under paragraph 237(a) and thereby causes the death of any other person is guilty of an indictable offence and is liable to imprisonment for a term not exceeding fourteen years.

(4) Where a person is convicted of an offence committed under paragraph 237(a) or (b) or subsection 238(5), he shall, for the purposes of this Act, be deemed to be convicted for a second or subsequent offence, as the case may be, if he has previously been convicted of

(a) an offence committed under any of those provisions;

(b) an offence under subsection 239(2) or (3); or

(c) an offence under section 234, 234.1, 235, 236, 240.1, or 240.2 or subsection 240(4) of this Act as this Act read immediately before the coming into force of this subsection.

(5) Nothwithstanding subsection 662.1(1), a court may, instead of convicting a person of an offence committed under section 237, after hearing medical or other evidence, if it considers that the person is in need of curative treatment in relation to his consumption of alcohol or drugs and that it would not be contrary to the public interest, by order direct that the person be discharged under section 662.1 on the conditions prescribed in a probation order, including a condition respecting his attendance for curative treatment in relation to his consumption of alcohol or drugs.

British Columbia Motor Vehicle Act Sections

24 hour prohibition

214. (1) In this section "driver" includes a person having the care or control of a motor vehicle on a highway or industrial road whether or not the motor vehicle is in motion.

(2) A peace officer may, at any time or place on a highway or industrial road when he has reason to suspect that the driver of a motor vehicle has consumed alcohol, request the driver to drive the motor vehicle, under the directon of the peace officer, to the nearest place off the travelled portion of the highway or industrial road and there to surrender his driver's licence.

(3) A peace officer may, at any time or place on a highway or industrial road when he believes that a driver's ability to drive a motor vehicle is affected by a drug, other than alcohol, request the driver to drive the motor vehicle, under the direction of the peace officer, to the nearest place off the travelled portion of the highway or industrial road and there to surrender his driver's licence.

(4) Where a peace officer requests a driver to surrender his driver's licence under this section, the driver shall forthwith surrender to the peace officer his driver's licence issued under this Act or any document issued in another jurisdiction that allows him to drive or operate a motor vehicle.

(5) Unless the prohibition from driving a motor vehicle is terminated under subsection (6),(7), or (8), the driver is automatically prohibited from driving a motor vehicle for a period of 24 hours from the time the peace officer requested the surrender of the driver's licence.

(6) Where a driver, who is requested to surrender his driver's licence under subsection (2), forthwith requests the peace officer to administer and does undergo as soon as practicable a test that indicates that his blood alcohol level does not exceed 50 mg. of alcohol in 100 mL. of blood, the prohibition from driving is terminated.

(7) Where a driver who is requested to surrender his driver's licence under subsection (2) produces, to a peace officer having charge of the matter, a certificate of a medical practitioner that

(a) states that the blood alcohol level of the driver did not exceed 50 mg. of alcohol in 100 ml. of blood at the time the certificate was signed, and

(b) was signed after he was prohibited from driving,

the prohibition is terminated.

(8) Where a driver, who is requested to surrender his driver's licence under subsection (3), satisfies a peace officer having charge of the matter that his ability to drive a motor vehicle is not affected by a drug, other than alcohol, the prohibition from driving is terminated.

(9) A peace officer acting under subsection (2) need not hold the opinion that the blood alcohol level of the driver exceeds 50 mg. of alcohol in 100 mL. of blood.

British Columbia Motor Vehicle Act Sections

(10) Where a peace officer prohibits a person from driving a motor vehicle under this section, the peace officer shall cause a report of the prohibition to be delivered to the superintendent unless the prohibition from driving a motor vehicle is terminated under subsection (6).

(11) The report referred to in subsection (10) shall be in a form established by the superintendent.

1982-36-32, proclaimed effective September 1, 1982

Driving with more than 80 milligrams of alcohol in blood.

220.1 (1) Everyone who, on a highway or industrial road, drives a motor vehicle or has the care or control of a motor vehicle, whether it is in motion or not, having consumed alcohol in such a quantity that the proportion thereof in his blood exceeds 80 milligrams of alcohol in 100 millilitres of blood, commits an offence and is liable on conviction to a fine of not less than $100 and not more than $2,000 or to imprisonment for not less than 7 days and not more than 6 months, or both.

(2) A person who is convicted of an offence under subsection (1) is automatically and without notice prohibited from driving a motor vehicle for 6 months as provided under section 92.

1982-73-2, proclaimed effective October 1, 1983

Demand for blood sample

220.2 (1) Where a peace officer on reasonable and probable grounds believes that a person has,

(a) within the preceding 2 hours, driven a motor vehicle or had the care or control of a motor vehicle on a highway or industrial road, and

(b) consumed alcohol,

he may, by demand made to that person forthwith or as soon as practicable, require him to provide then or as soon thereafter as is practicable a sufficient sample of his blood, as in the opinion of the person taking the sample is necessary, to enable a proper analysis to be made in order to determine the proportion, if any, of alcohol in his blood, and to accompany the peace officer for the purpose of enabling that sample to be taken.

(2) Where the person referred to in subsection (1) is incapable, due to physical or mental trauma, of comprehending the nature of a demand under subsection (1), a sufficient sample of his blood, as in the opinion of the person taking the sample is necessary, to enable a proper analysis to be made in order to determine the proportion, if any, of alcohol in his blood, may be taken from that person without a demand being made under subsection (1).

British Columbia Motor Vehicle Act Sections

(3) A blood sample may be taken under this section only by a person or a class of persons approved by order of the Attorney General, a medical practitioner or a registered nurse within the meaning of the Nurses (Registered) Act.

(4) A blood sample taken under this section may only be analyzed by a person or class of persons approved by order of the Actorney General using a method approved as suitable for the purposes of this section by order of the Attorney General.

1982-73-2, proclaimed effective October 1, 1983

Refusal to give a blood sample

220.3 (1) A person who without reasonable excuse fails or refuses to comply with a demand made under section 220.2(1) commits an offence and is liable on conviction to a fine of not less than $100 and not more than $2,000 or to imprisonment for not less than 7 days and not more than 6 months, or both.

(2) A person who is convicted of an offence under subsection (1) is automatically and without notice prohibited from driving a motor vehicle for 6 months as provided under section 92.

1982-73-2, proclaimed effective October 1, 1983

Proof of blood sample

220.4 (1) In a proceeding under section 220.1, where a blood sample of the detendant was taken

(a) pursuant to a demand made under section 220.2(1) or pursuant to section 220.2(2), and

(b) as soon as practicable after the time when the offence was alleged to have been committed and in any event no later than 2 hours after that time,

evidence of the result of an analysis of the blood sample is, in the absence of any evidence to the contrary, proof of the proportion of alcohol in the blood of the defendant at the time when the offence was alleged to have been committed.

(2) In a proceeding under section 220.1, where a blood sample of the defendant was taken pursuant to a demand made under section 220.2(1) or pursuant to section 220.2(2), a certificate of a person referred to in section 220.2(3) or (4) stating that he has

(a) taken the blood sample of the defendant, or

(b) made an analysis of the blood sample of the defendant and stating the result of his analysis

is evidence of the statements contained in the certificate without proof of the signature of the person appearing to have signed the certificate.

British Columbia Motor Vehicle Act Sections

(3) In a proceeding under section 220.1, where a blood sample of the defendant was taken pursuant to section 220.2(2), a certificate of a medical practitioner stating that, in his opinion, at the time the blood sample was taken the defendant was incapable, due to physical or mental trauma, of comprehending the nature of a demand under section 220.2(1) is evidence of the statements contained in the certificate without proof of the signature of the person appearing to have signed the certificate.

(4) In a proceeding under section 220.1, where a blood sample of the defendant was taken pursuant to a demand made under section 220.1(1) or pursuant to section 220.2(2), the proportion of alcohol in the blood sample of the defendant at the time of the analysis shall be deemed to be the same as the proportion of alcohol in the blood of the defendant when the sample was taken, unless the defendant proves otherwise.

(5) A defendant against whom a certificate described in subsection (2) or (3) is produced may, with leave of the court, require the attendance of the person who made the certificate for the purposes of cross examination.

(6) No certificate shall be received in evidence pursuant to subsection (2) or (3) unless, before the trial, the defendant has received reasonable notice that the certificate will be introduced and has received a copy of the certificate.

(7) The Lieutenant Governor in Council may prescribe the form and content of certificates to be used in this section.

1982-73-2, proclaimed effective October 1, 1983

Civil liability

220.5 (1) No action lies, for damages or otherwise, against any person as a result of the taking or analyzing of a blood sample under section 220.2 except an action for damages arising out of negligence in technical procedures used in taking the blood.

1982-73-2, proclaimed October 1, 1983

No legal obligation

220.6 Nothwithstanding anything in section 220.1 to 220.5, a person authorized to take a blood sample under section 220.2(3) may decline to take a blood sample from a person where to do so would, in the opinion of a medical practitioner, endanger the person's health or life.

1982-73-2, proclaimed October 1, 1983

British Columbia Motor Vehicle Act Sections

Prohibition against driving by court

90 (1) For the purpose of this section, "convicts" includes the granting of an absolute or conditional discharge,

(2) Where a court convicts a person of an offence under

(a) this Act or the regulations

(b) sections 233, 234, 235, or 236 of the Criminal Code, or

(c) section 203, 204, 219 of the Criminal Code where the section was contravened by means of a motor vehicle,

the court may

(d) consider the person's driving record, and

(e) notwithstanding that the person is or may be subject to another prohibition from driving, prohibit the person from driving a motor vehicle for a definite period of time if the court considers that the facts of the case or the person's driving record or both the facts of the case and his driving record when taken together justify the prohibition.

(3) Subsection (2) does not apply

(a) where neither the defendant nor his agent or counsel appears before the court at the time of conviction, or

(b) where the defendant is convicted of an offence under section 76.

(4) Where a court prohibits a person from driving a motor vehicle under this section, the court shall order that the prohibition

(a) take effect immediately

(b) continue for the full day of each day of the prohibition, and

(c) continue for consecutive days.

(5) A person who is prohibited from driving a motor vehicle under this section for a period of more than 3 years, may make an application to the court that prohibited him from driving for a review of the length of the prohibition, after 3 years of the prohibition have elapsed and after notifying the superintendent.

(6) On an application under subsection (5), the court may, where it considers that it is not contrary to public interest, reduce the length of the prohibition or cancel the prohibition.

(7) Where the court reduces the length of a prohibition or cancels a prohibition under subsection (6), it shall forthwith notify the superintendent of its decision.

1982-36-19, proclaimed effective September 1, 1982; 1984-30-51, effective June 11, 1984 (B.C. Reg. 165/84);[amended 1985-52-29, not in force, amendment not included]

British Columbia Motor Vehicle Act Sections

91. [Repealed 1982-36-19, proclaimed effective September 1, 1982] [Re-enacted 1982-36-19, to be proclaimed]

Automatic prohibition against driving on conviction

92. (1) For the purpose of this section, "convicted" includes the granting of an absolute or conditional discharge.

(2) A person who is convicted of an offence under

(a) section 88, 94, 220.1(1) or 220.3(1),

(b) section 233, 234, 235, or 236 of the Criminal Code, or

(c) section 203, 204, 219 of the Criminal Code where the section was contravened by means of a motor vehicle

is automatically and without notice prohibited from driving a motor vehicle for 6 months from the date of sentencing, the date that the passing of sentence is suspended, the date of being granted an absolute or conditional discharge or the date a court makes a disposition under the Young Offenders Act (Canada) or the Young Offenders Act (British Columbia)

(3) Subsection (2) does not apply where neither the defendant nor his agent or counsel appear before the court at the time of conviction.

1982-36-19, proclaimed effective September 1, 1982; 1982-73-1, proclaimed effective October 1, 1983; 1984-30-52,53, effective June 11, 1984 (B.C. Reg. 165/84; [amended 1985-52-60, not in force, amendment not included)

APPENDIX C

Executive Summary of CounterAttack Traffic Research Papers, 1985. Ministry of Attorney General, British Columbia, 1986

EXECUTIVE SUMMARIES

Influences on Passenger Vehicle Casualty Accidents: Unemployment, Driver Gender, Driver Age, Drinking Driving and Restraint Device Use

The results of this study of monthly casualty accident data between January 1978 and December 1984 in British Columbia suggest the following:

1. Both the severity of traffic accidents, as measured by the percentage of fatal injuries, and the frequency of casualty accidents per million driven kilometers have been decreasing over the time period in question.

2. Some portion of this change can be attributed to increases in unemployment, which appear to remove young male drivers from the driving population. This in turn arguably decreases the number of drinking drivers and increases restraint device use in the driving population, which in turn both produce decreases in accident frequency and severity.

3. Changes in employment levels produce stronger effects on accident frequency than on accident severity.

4. Over the time period in question, restraint device use in B.C. increased. However, the relationship between this increase and decreases in either the severity of passenger vehicle casualty traffic accidents or the frequency of these accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender.

5. Over the time period in question, the percentage of alcohol-related casualty traffic accidents in B.C. decreased. However, the relationship between this decrease and decreases in the frequency of passenger vehicle casualty traffic accidents per million driven kilometers can be explained by increases in the unemployment variables in conjunction with changes in the driver demographic variables of driver age and driver gender. On the other hand, controlling for the effects of changes in the unemployment and driver demographic variables, there was a statistically significant relationship between these decreases and decreases in the severity of passenger vehicle casualty traffic accidents as measured by the percentage of fatal injuries.

However, it must be noted that, while on balance changes in unemployment levels which arguably produce changes in driver demographics appear to be related more strongly to changes in casualty traffic accident frequency and severity than are changes

in driver behaviour concerning drinking driving and restraint device use, it must be emphasized that the results of this study are based on very rough measures (i.e. monthly averages) and that the majority of the variance in the accident frequency and severity variables has not been explained by the suggested model. In short, these analyses suggest a pattern but can not be taken as firm conclusions. Nonetheless, the results of this study clearly show that changes in traffic accident figures must be considered within the context of economic trends and driver demographics in addition to the dimensions of in-vehicle behaviour such as restraint device use and drinking-driving.

THE MEDIA AND POLICE ENFORCEMENT CAMPAIGNS

The Relationships among Driving While Impaired Charges, Police Drinking Driving Roadcheck Activity, Media Coverage and Alcohol-Related Traffic Accidents

A correlational examination of 54 consecutive months of data from British Columbia on the relationships among the number of vehicles checked in police drinking-driving roadchecks, the number of Driving While Impaired (DWI) charges laid, the number and percent of alcohol-related casualty traffic accidents, and the extent of media coverage on drinking-driving (as measured by print media coverage), revealed that: the extent of media coverage, and not the extent of roadchecks or charging activity is probably the critical element in the reduction of drinking-driving accidents. The failure of the minimally publicized April-May 1984 British Columbia police roadcheck "blitz" to reduce either the number or proportion of alcohol-related casualty traffic accidents lent support to these correlational findings.

Print Media Content and Drinking-Driving Accidents, British Columbia, 1980-1984

This examination of print media in British Columbia from 1980-1984 shows that monthly increases in the number of articles on drinking driving related to decreases in the monthly percentage of alcohol-related casualty traffic accidents. This can in part be explained by the third variable of the December CounterAttack roadcheck enforcement blitzes. When drinking-driving blitzes occur, they generate a large number of press articles that are blitz-specific, as well as a large number that are on drinking driving in general. Arguably, these articles increase drivers' perception of both the general dangers of drinking driving, as well as the specific threat of an increased probability of apprehension for drinking driving. Consequently there is less drinking driving and fewer alcohol-related traffic accidents.

On the other hand, the monthly proportion of print article content or monthly proportion of groups mentioned in drinking-driving articles failed to predict any monthly reduction in alcohol-related casualty traffic accidents. One possible explanation for this finding could be that, in a broader sense, there is very little difference between one press article on drinking driving and another. That is, all of the articles condemn drinking driving and are therefore all essentially the same message, so it really does not matter to the reader to which specific group the message is attributed. Similarly, the article content codes for this study may be measuring differences that are too subtle to be meaningful or produce varying effects on the readers of the articles.

Finally, the overall trend of an increase in print articles on drinking driving and a decrease in the percentage of alcohol-related traffic accidents suggests that public attitude may be becoming less accepting of drinking driving, and consequently there are fewer drinking drivers on the roads. Perhaps with continued enforcement and public education, these attitude changes can be maintained to produce a long-lasting reduction in drinking-driving accidents.

The Kamloops Experiment: Media Amplification of a 2-week Drinking-Driving Police Roadcheck Enforcement Campaign in a British Columbia Community

In order for a police enforcement campaign to be effective in affecting drivers' behaviour, it is reasonable to assume that drivers must be made aware of the campaign. Police visibility and the laying of charges, while necessary for the campaign to exist at all, has not been sufficient to make the public aware of same. An attempt at media saturation and community involvement in the Kamloops area of British Columbia in publicizing a two-week, province-wide drinking-driving roadcheck police enforcement campaign brought the awareness of the campaign up to 51% in the Kamloops area, as opposed to an awareness level of only 16% in the remainder of the province. The total media cost for the Kamloops area was about $7,000, or perhaps 65% of the insurance costs of a single, injury-producing traffic accident. It consisted of paid radio and newspaper messages, and of supplying the community with posters and lapel stickers. In order to coordinate the publicity associated with the Kamloops area campaign, the Kamloops Steering Committee, representing a wide range of community groups was also formed.

The results of this study clearly show that paid media messages combined with community support constitute an effective method of making the public aware of a police drinking-driving enforcement campaign, and that the lack of paid media amplification of the police campaign will result in the public not being aware of the campaign. This, in turn, will probably result in the failure of the campaign to change the public's driving behaviours and thus there will probably be no reduction in associated traffic accidents.

In short, the simple fact of police presence and the unassisted media interest generated by same are not enough to make the public aware of a drinking-driving roadcheck enforcement campaign. Paid advertisement, preferably in conjunction with local community support, is necessary in addition to police efforts.

The Effects of Media Amplification of Police Presence in a 2-week Intersection Enforcement Campaign

The results of this study indicate that the newspaper and radio media campaign carried out by the Victoria Area police to publicize their two-week intersection enforcement campaign was effective in conveying the fact of the campaign to the public, substantially reducing intersection violations, and in changing the nature of the violations that did occur. Had the Victoria Area enforcement campaign proceeded without the media campaign, it would have produced five times the number of charges at an estimated additional cost of $44,000.00 in justice system and administrative expenses. As the cost of the media campaign did not approach 1% of these estimated savings, it follows that extensive use of the media to publicize and amplify police enforcement efforts can be a cost-effective method of, at least for a short period, reducing the frequency of driving violations without substantially increasing justice system costs.

DRIVERS' CHARACTERISTICS AND ACCIDENTS

Convicted Drinking Drivers: Sex, Age, Other Traffic Convictions and Traffic Accidents. British Columbia, June 1980 - December 1984

In sum, the results of these analyses suggest that the situation is one of the impaired problem driver as opposed to the impaired driver problem. That is, when compared to drivers who have not been convicted of Driving While Impaired, those convicted of DWI have had about twice as many other driving-related convictions and over twice the number of reported traffic accidents. On the whole, convicted drinking drivers appear to be relatively dangerous drivers who also consume alcohol. From this it follows that drinking driving countermeasures might be best associated with a broad spectrum of driver training and education that includes, but is not limited to, information on alcohol.

Five Driver Licence Categories: Drivers' Age, Traffic Convictions and Traffic Accidents. British Columbia, June 1980 - December 1984

Professional drivers (i.e. Licence Classes 1-4) showed a substantially higher traffic conviction rate and traffic accident rate than did non-professionals (i.e. Licence Class 5.) However, if one were to assume that professional drivers had four times the driving exposure of non-professionals, then in all likelihood they are substantially better drivers per driven mile than are non-professionals.

Age v.s. Driving Experience as Predictors of Young Driver's Traffic Accident Involvement

In sum, the tendency for young drivers to be involved in a disproportionately high number of traffic accidents can not be explained by simply age or by driving experience, and may well be more psychologically determined. Unfortunately, if this is the case, countermeasures that are fair and equitable to all members of an age or experience group would be very difficult to legislate.

Casualty Accidents Involving Vehicles Registered Out-of-Province, British Columbia, 1984

In addition to general driving experience, familiarity with the general driving environment and specific route taken are important factors in avoiding traffic accidents. The driving environment of British Columbia can be characterized as being comprised of winding mountain roads with little run-off area and of densely packed urban centers. Arguably, both of these sorts of environments draw out-of-province visitors because of their novelty to the visitor, yet this same novelty makes the driving environment a more dangerous one for the visitor than for the local resident.

The results of this study show that, when compared to B.C. registered vehicles in casualty traffic accidents, out-of-province vehicles are involved in a higher proportion of accidents, accidents occurring on any day of the week (as opposed to primarily during the week-end), accidents occurring in the Summer months, and accidents not involving alcohol. From this, one gets the picture of a tourist on summer holiday travelling during the day. However, the relatively high proportion of out-of-province drivers in fatal accidents driving commercial vehicles and the relatively high proportion of out-of-province drivers in hit-and-run casualty accidents warrants some concern.

CAUSES AND LOCATIONS OF TRAFFIC ACCIDENTS

Casualty Traffic Accident Causes by Police Reporting Area, British Columbia, 1984

This is a tabular presentation of some of the primary causes of casualty traffic accidents broken down by police reporting detachments.

Casualty Traffic Accident Locations by Police Reporting Area, British Columbia, 1984

This is a tabular presentation of the locations of casualty traffic accidents (e.g. intersection, bridge) broken down by police reporting detachments.